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Development of the Principal Clarinets and Representative Music From 1696-1843

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DEVELOPMENT OF THE PRINCIPAL CLARINETS
AND REPRESENTATIVE MUSIC FROM 1696 TO 1843

A Thesis

Presented to
the Graduate Faculty
Central Washington College of Education

In Partial Fulfillment
of the Requirements for the Degree
Master of Education

by
Robert Clarence Holtz
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CHAPTER I

THE PROBLEM, LIMITATIONS AND DEFINITIONS OF TERMS USED

In its comparatively short lifetime, several complete books and many chapters of other books have been devoted to the clarinet. The books and chapters have done justice to the instrument acoustically, mechanically, and historically. In view of the many variable clarinet systems, there is a need to present the development of the principal systems leading to the present Boehm system and to point out the development of the literature of the clarinet during that period.

As the title indicates, this study is not a treatise. It will present the clarinet properties, a brief history, the principal clarinets, an analysis of selected music, and a comparison study of the clarinets to the selected music. Of the subdivisions within the clarinet family, the study is concerned with only the "soprano" clarinets. From the soprano clarinet descended the alto, tenor, bass (the lower pitched instruments), sopranino, and octave (the higher pitched instruments) clarinets.

The technical terminology has been omitted in this study. Only information relating to the clarinet's characteristics, the mechanical structure, and the fingering system

will be presented to give the clarinet player adequate knowledge about the development of the instrument and its music.

I. THE PROBLEM

Statement of the problem. The purpose of this study was (1) to point out the development of the mechanical structure of the principal clarinets in use from the instruments' inception in about 1690 to the development of the Boehm system in 1843 and (2) to show the development of the clarinet literature during that period.

Importance of the study. The writer has no knowledge of a study giving fingering charts with the description of the clarinets, relating the difficult whole-step and half-step trills of each of the clarinets studied, and, with representative music, comparing the mechanism of one clarinet to the mechanism of another "improved" clarinet. This study will give the reader a knowledge of the clarinet's evolution and an insight into the development of the literature for the clarinet.

II. LIMITATIONS

Criteria for determining the principal clarinets.

Consideration was given to a number of factors in determining

which of the many systems on record would serve the best interests of this study.

One of the most important factors was to ascertain the clarinet offering the greatest, or best, improvement over what had already been established. The length of time a system was in use would tend to indicate the instrument was at least partially acceptable for that period of time. If not, it would tend to indicate that an instrument of sufficient merit to take its place had not appeared. The performers who were considered virtuosos on their instruments must have insisted on adequate instruments whenever possible. In addition, the manufacturers who had the most number of clarinets in the hands of performers must have had to their credit the most "popular" clarinet system over that period of time. These factors, plus the knowledge of the instrument and the emphasis given by the authors in recognized publications, aided in determining the principal clarinets or clarinet-systems in this study.

Criteria for determining the representative music.

Several factors aided in determining which of the available literature was to be selected as representative music.

During the first seventy years of the clarinet's existence, very little was written for the instrument. Only one or two pieces written before 1750 might be available in

Europe in manuscript form. The music examples recorded within this study have been selected for the following reasons: (1) the music was available, (2) the music depicted the possibilities of the existing clarinets. That is, it involved the useful or controllable range, skips, and trills, and (3) the music was more easily performed by one clarinet of a certain system than by another clarinet of an older system.

The music was not necessarily selected because of its familiarity, its fast passages, or its range, unless it was difficult to perform on one clarinet and easier on another "improved" clarinet.

Description of fingerings used. From the mouthpiece (top) to the bell (bottom) the open holes are numbered. The left hand will use the holes numbered "1," "2," and "3," while the right hand will use the holes numbered "4," "5," and "6," (also "7" when considering the older clarinets). "T" will refer to the thumb and "S" will signify the speaker key. A black circle (●) indicates a closed hole and a white circle (○) indicates an open hole. As an example, the fingering for a below the treble clef on a Boehm system clarinet will be as follows:

(top) Left hand (L)					(bottom) Right hand (R)		
S	T	1	2	3	4	5	6
0	●	●	●	●	●	●	0

Thus, to finger a below the treble clef, put down the thumb and five fingers, leaving the sixth finger hovering over the opening but not closing the hole.

The key names are determined by the lowest note sounded when using the key. As an example, the fingering for third line b in the treble clef on a Boehm system clarinet would be as follows:

(top) Left hand (L)					(bottom) Right hand (R)		
S	T	1	2	3	4	5	6
●	●	●	●	● <i>E</i>	●	●	●

Thus, to finger b, press the speaker key, cover the hole with the thumb and the holes numbered one through six, and press the E key with the left little finger.

Description of staff notation.



III. DEFINITION OF TERMS USED

Mechanism. Throughout this study the term "mechanism" will refer to the arrangement of tone-holes and keys.

Fork-fingering. The term "fork-fingering" designates a process of lowering the pitch of a sound from an open hole by closing a hole or holes below an open hole.

Difficult whole-step and half-step trills. Within Chapter IV, "difficult whole-step and half-step trills" are given for each of the principal clarinets. These trills are considered difficult if an awkward finger movement is involved, such as (1) a sliding action of the thumb or finger, (2) a double-movement--one or more fingers rising off a hole or lever while one or more fingers are closing a hole or pressing a lever, (3) a movement of one or more fingers in one hand in one direction while moving one or more fingers in the other hand in the same direction, or (4) a clumsy movement within either hand.

Cross-fingering. The term "cross-fingering" is a type of double-movement in which one or more fingers move in one direction while one or more fingers move in the opposite direction (up or down). A cross-fingering movement may involve one or both hands.

IV. ORGANIZATION OF THE REMAINDER OF THE THESIS

Chapter II will examine the characteristics of the clarinet. The historical development of the various clarinets will be pointed out in Chapter III. Representative sketches of the principal clarinets and their fingering charts will be included within Chapter IV. In addition, examples of difficult whole-step and half-step trills will be included for each clarinet sketched. The music examples illustrated in Chapter V were selected as representative literature. The analysis of the representative music is concerned with the music, not the instrument involved in performing the music. Using Mozart's Clarinet Concerto in A Major, Chapter VI will compare the difficulties of Denner's two-key clarinet with the improved five-key clarinet, the difficulties of the five-key clarinet with the improved thirteen-key clarinet, and the difficulties of the thirteen-key clarinet with the improved Boehm-system clarinet. A portion of Berlioz' sixty difficult passages for the clarinet is inserted as an example of the technique problems encountered about 1840. The conclusions will be stated in Chapter VII.

CHAPTER II

PROPERTIES OF THE CLARINET

The qualities of the clarinet have been discussed and recorded in several books and many articles. This chapter will contain a brief review of the characteristics of the clarinet.

I. CLASSIFICATION OF THE CLARINET

The clarinet is classified as a wind instrument. That is, it is an instrument sounded by the breath. It is further defined as a woodwind instrument, as is the flute, oboe, or any other instrument which uses air-reeds or cane-reeds. The brasswind instruments include the trumpet or cornet, horn, trombone, tuba, or any instrument sounded by the breath which uses a cupped or conical mouthpiece in conjunction with lip-reeds.

The group of cane-reed woodwind instruments may be further classified into two groups: (1) the double cane-reed, of which the oboe and bassoon are members, and (2) the single cane-reed, of which the saxophone and clarinet are members (6:1-4).

II. COMPONENT PARTS

Most clarinets are now made of five separate parts:

mouthpiece, tuning-barrel, upper joint, lower joint, and bell. These parts are fitted with tenon-and-socket joints, the tenons having cork inserts to promote an airtight connection. To the mouthpiece, which resembles a beak, is secured a thinly tapered reed with a metal band. The tuning-barrel may be a separate part or connected to either the mouthpiece or the upper joint. The tuning-barrel has no keys or holes but is fitted with socket joints to extend or contract the length of the instrument. The upper and lower joints are separated on most clarinets for the sole purpose of easier carrying when unassembled. Upon these joints are spaced holes and keys to obtain differently pitched notes. The bell has no keys or holes but is a part of the length of the instrument. Mr. D. J. Blaikley, a member of the Musical Association of London, was asked what extent the bell altered the pitch of the instrument. He replied, "It modifies the tone of the clarinet, and also causes the series of harmonics to depart slightly from the series of a strictly cylindrical tube" (5:32).

III. MECHANISM

The brass keys of the early clarinets were of elementary construction. Keys made to open a hole were simple levers, but keys made to close a hole were actually two

levers, one acting upon the other. Each lever was pinned through a channel cut into the body of the instrument. The pin served as an axle, and a flat spring pressed down one end of the lever. A flat piece of leather was placed on the flat, square under-surface of the key to act as the seal (7:402).

Gradually the keys were improved. Keys with shallow cups holding stuffed pads instead of leather made better seals. The keys were later mounted on "saddles" anchored to the body of the instrument. The use of the saddles eliminated the bulges and greatly reduced the manufacturer's percentage of cracking and chipping problems (7:404).

Near 1840 some of the lever keys were replaced by a new key-mechanism, horizontal rod-axles, providing adequate control over the increasing number of notes. With the rod-axles came the "spectacles," keys which surrounded finger-holes but did not close a remote hole until a finger closed the finger-hole (7:405). Rendall, in The Clarinet, states that Xavier Lefevre, the well-known French player, had a ring key fitted to his clarinet in 1826 (14:102).

The clarinet has four kinds of mechanism: (1) holes closed directly by the finger tips, (2) holes closed through the use of levers, (3) holes opened through the use of levers, and (4) holes opened or closed automatically with the opening and closing of other holes (21:3).

The metal ligature was adopted by some clarinet players about 1825, but there are still those who prefer to bind the reeds to the mouthpiece with string or cord (11:159).

IV. ACOUSTICS

The clarinet acts as a stopped-pipe, but as late as 1883 there was doubt whether the clarinet was a stopped or open-pipe instrument. An erroneous theory by William Rowlett stated that reeds determined whether the instrument overblows an octave or a twelfth. Briefly stated, the theory contended that a stiff reed would "rule the column" and a weak reed would be "ruled by the column." The oboe and bassoon were then stated as having weak reeds, the overtones ruled by the columns producing the octave, and the clarinet as having stiff reeds, the overtones ruled by the reed and produced the twelfth (5:22).

The pitch of a wind instrument depends upon the number of vibrations (which cause the sound) and the length of the instrument. An instrument is a tube of definite length, thus the vibrations are limited. The player of a wind instrument is able to produce sympathetic vibrations to the basic or fundamental tone by varying the intensity of the air-stream. The sympathetic vibrations are called

harmonics or overtones. These overtones always fall in a set pattern or interval, one from another. The second overtone, no matter what the fundamental tone, will always be an octave above that fundamental tone. The third overtone will always be a twelfth above the fundamental tone. As the number of overtones increases, the interval between the overtones decreases until the distance between tones, at about the sixteenth overtone, becomes difficult to sound. A long tube would be able to produce the same harmonics or overtones as a short tube, but the series of tones would start lower in pitch. Reasonable width of a tube will determine how many overtones are possible. The smaller diameter tube will emit more in the series than will a tube of the same length with a larger diameter. The clarinet has a rather large diameter; therefore it favors the lower end of the harmonic series (10:178).

Instruments with a conical bore, such as the oboe and bassoon, act the same way as the open pipes of an organ. The air-vibrations travel through the length of the tubing only once. If the tubing were stopped, the note produced would be an octave lower. All conical instruments overblow an octave to produce the second overtone (9:178).

Instruments with a cylindrical bore act in the same way as the stopped pipes of an organ. The air-vibrations

travel through the length of the tubing and back again. Thus, the note produced by a cylindrically bored instrument is one octave lower than the note produced by a conically bored instrument of the same length. The first overtone the clarinet is able to produce is the third, the interval of a twelfth above the fundamental. Because the instrument acts as a stopped-pipe, only the odd harmonics (3, 5, 7, et cetera) are playable (10:179).

One of the big differences between the wind and brass instruments is the number of overtones obtainable. Because woodwinds have a comparatively large bore for the amount of tubing, the low overtones are easily played, while the higher harmonics are difficult to sound. The brass, on the other hand, have a comparatively small bore for the amount of tubing. For that reason, the higher overtones are accessible while the fundamental tones are difficult to sound (10:180).

V. SOUND CHARACTERISTICS

Characteristics of tone quality distinguish the national schools of clarinet playing. Generally the French use a Boehm-system clarinet with a comparatively narrow bore. They usually prefer a short lay mouthpiece with a soft reed. As a result, the tone "inclines to sound thin and pinched, and often reedy in the upper register" (1:121).

German players, until lately, used a non-Boehm system. The clarinet had a wider bore with a longer cylindrical section and a comparatively narrow, pointed mouthpiece with a smaller opening at the lay. The reed was smaller, harder, and tied on the mouthpiece with a special silk cord. "The best German players are able to obtain the broadest and creamiest sound of any . . ." (1:122).

In England the players generally prefer a longer lay and a hard reed. With a wider bore Boehm-system than the French, the English obtain the "full liquidness and expressive power up to the top of the upper register--especially on the crucial note c''''. . ." (1:121).

One of the most characteristic features of the clarinet is the marked difference of tone-color in its registers. The bottom register, Chalumeau, "has a hollow, reedy intensity . . . little used by composers." The Throat register, from f' to b' flat, the weakest in quality, is technically difficult to manage. The Clarinet register, from b' to c', is the best register of the instrument. "In the hands of a good artist the tone of this part of its compass is nobly expressive, beautifully clear, pure and even" (10:262).

CHAPTER III

HISTORICAL DEVELOPMENT AND EARLY USE OF THE CLARINET

In 1730 J. G. Doppelmeyr published a book containing the following statement concerning J. C. Denner, a flute-maker: "At the beginning of the present century he invented the so-called clarinette . . . and finally produced improved chalumeau." Because of this statement, musicologists have reason to believe the clarinet was not an invention or discovery but an improvement of the already existing chalumeau (16:320).

I. THE CHALUMEAU

Chalumeau is a French form of shawm or shalmey and a generic name for instruments with (1) wooden pipes played with a double reed, (2) wooden pipes played by a single reed, and (3) the chanter of Bagpipes (10:251).

To support evidence that the chalumeau was a wooden pipe played by a single reed, Diderot and d'Alembert's Encyclopedie of 1767 shows an illustration of a two-piece instrument with eight finger holes and a detachable mouthpiece fitted with a single reed (17:66).

The use of the chalumeau was quite limited. The range of the instrument was not large, consisting of an octave.

Because some instruments had no keys, some tones had to be fork-fingered, a process of lowering the pitch of a sound from an open hole by closing the hole immediately below it. Oboists or flutists usually played the chalumeau when it was called for in the score. Inasmuch as the oboes and flutes permitted easier facility through the use of keys, the players felt little need to develop a "skill" for the chalumeau (17:67).

II. THE TWO-KEY CLARINET

The year 1696 has been set as the date the clarinet was an instrument of its own. Johann C. Denner, the flute-maker, is given credit for discovering that by only partially closing the thumb hole, higher notes, overtones, were possible. His first clarinets had two keys directly opposite each other above the thumb hole. With the opening of either key, a' could be produced, and by opening both keys, b' could be sounded. Either of the two keys could be positioned at the top of the instrument. (The fingerings and an illustration for this two-key clarinet are given in Chapter IV). In his later models, Denner moved the key by the thumb up towards the mouthpiece and inserted a small brass tube into the bore to prevent moisture from coming through the hole. When opened with the A key, this improved

speaker-key sounded b' flat instead of b' natural (6:151-3).

III. THE THREE-KEY CLARINET

By 1720 the bell had been lengthened and a new tone hole provided with an open key. With the addition of the third key, the left hand was permanently positioned above the right hand. The lengthened instrument now sounded e below the treble clef as its lowest note and the harmonic b' natural with the same fingering, with the addition of the speaker key. The improvement enabled the opening of the A key and the speaker-key to sound b' flat.

No fingering chart exists for the three-key clarinet, but some three-key clarinets made by Lindner, Scherer, and others are preserved in Brussels and Nurnberg (6:154).

IV. THE FIVE-KEY CLARINET

The five-key clarinet was preceded for a short time near "the end of the third quarter of the century" by a four-key clarinet containing a closed key for low g sharp (16:321). This first chromatic key and low f sharp were added between 1760 and 1770 by an organ-builder, Berthold Fritz, of Brunswick (4:99). With the addition of the fifth key, composers started considering the clarinet a useful instrument. Rendall states, in Grove's Dictionary of Music and Musicians,

that the expressiveness and beauty of tone was "marred by hideous faults of intonation, especially in the chalumeau. This register was particularly weak and toneless" (16:323). Virtuosos such as Tausch and Beer were effectively elevating the clarinet to the rank of a solo instrument. Anton Stadler, with his "soft vocal qualities of . . . tone which no one with a heart could withstand" (17:86), led Mozart to write the quintet and concerto numbers so well-known and often played by clarinetists.

V. THE SIX-KEY CLARINET

Anthony Baines (1:299) suggests Stadler may have added the C sharp key, while Bessaraboff (4:99) states the sixth key, C sharp, was added by Xavier Lefevre. In England the sixth key was the a' to b' trill key on the upper joint used by the right index finger (1:299). Bessaraboff describes an illustrated six-key English clarinet of about 1800 as follows:

Six keys. (5 keys and a' shake trill key) Box-wood, stained light yellow-brown. Ivory tips. Made in six parts: mouthpiece, barrel, three body-joints, and bell. Seven finger-holes in the front, a thumb-hole in the rear. Three square brass keys on the lower body-joint: e (open), f sharp, and g sharp; the two lowest keys have long levers operated by the left little finger. Three keys on the upper body-joint: a', the a' shake key, and the speaker-key (4:99).

VI. ADDITIONAL KEYS

Between the development of the six-key clarinet and the next improvements, very little mention is given to clarinets having less than thirteen keys. During this period, about 1800 to 1820, the lack of craftsmanship and inventiveness slowed the progress of the clarinet.

Keys, one at a time, were added to avoid fork-fingering or the sliding of fingers from one key to another. The English added a closed cross-key for the right (hand) second finger to improve the intonation of b natural. The next addition was a closed cross-key for the left (hand) third finger, installed to improve the e' flat and eliminate another fork-fingering. The English clarinet now had eight keys, to which was sometimes added the closed c sharp key pressed by the left (hand) little finger.

Later, as improvements were made, the fork-fingered b flat was replaced by a closed key for the right (hand) third finger. Another fork-fingered note, f' natural, received a closed key used by the right first finger. One of the last fork-fingered notes, g' sharp, was changed to a closed key used by the left (hand) first or second finger (17:Chapter VIII). (An illustration and fingering chart for the thirteen-key English clarinet are included in Chapter IV).

Iwan Muller, a virtuoso on the clarinet, having studied the five-key clarinet with French and German manufacturers, produced a thirteen-key instrument consisting of "a rational rearrangement of tone-holes, in assigning a separate tone-hole and key to each semitone . . ." (16:323). Muller was concerned "not only with giving it [the clarinet] an adequate key-system, but also with the acoustical betterment of the instrument" (6:160). The right hand little finger was given a closed key for low f. The f hole had previously been bored above the g sharp hole so that the little finger could reach it, and slanted toward the bell to sound f (6:160). Rendall (17:94) states that the Muller clarinet had two right hand thumb-operated levers, one to trill e to f sharp and another to trill f to g sharp. The thumb levers were replaced by rollers invented by Cesar Jenssen (17:94). The rollers, fitted to adjacent keys, let the little fingers slide from one key to another without letting an unwanted note sound between the two.

Near the same time as Muller's clarinet, an Englishman, William Gutteridge, patented an eighteen-key clarinet which "far surpasses Muller's in ingenuity . . ." Gutteridge devised a complicated lower joint key arrangement to solve the difficulty of playing from key to key. A closed b' natural key alongside the speaker key was to solve the difficulty of playing across the break. The mechanism demanded

skills not yet acquired by the makers. Thus, the instrument was abandoned for reason of other improved clarinets as craftsmanship improved (17:96).

Adolphe Sax, a skilled clarinetist and craftsman from Brussels, added several features to the clarinet about 1840 to 1842. He extended the range down to d, intending to obtain "a purer b' flat and a'." He increased the ease and security of tone in the upper register "as far as c''' and even to d and e beyond" by adding another speaker key. By means of rings for the right fingers, instead of closed keys, it was possible to play d' and f' in tune, "an impossible feat before" (17:101). Further improvement by Sax placed a long tenon between the upper and lower joints to position the c' sharp hole correctly. The extended soprano clarinet with the additional speaker key has not survived; however, the rings for the lower joint and the long tenon are still in use (17:101). The Adolphe Sax improvements were outweighed and often discredited by the presence of the Klose-Buffer clarinet in 1843.

VII. THE BOEHM-SYSTEM CLARINET

After four years of collaborating, Hyacinthe Klose and Augusta Buffet produced the Boehm-system clarinet. The mechanism incorporated features of the Boehm flute made by

Theobald Boehm--therefore the name, Boehm-system clarinet (17:102). The Klose-Buffet instrument did what Muller had attempted with his thirteen-key clarinet--placed the tone holes in the acoustically correct location and provided a mechanism offering better facility to and from almost every note. Through the use of duplicate key and tone-holes, many difficult passages for the "simple" clarinets are now easily played on the Boehm-system clarinets (6:160).

The Boehm-system has twenty-four holes and seventeen keys. Duplicating keys were added for the little fingers of both hands except for the G sharp key of the right hand. Thus, the three lowest notes can be played with either little finger. Klose added a closed B key, played with the third right hand finger, to prevent cross-fingering b flat to b natural. Rings and cover keys on rod-axles were fitted to the upper joint. Alternative side keys provided a choice of fingerings over the break, b' flat to c' (6:164).

VIII. EARLY USE OF THE CLARINET

Comments concerning the early use of the clarinet show varied opinions about its use and importance. Oscar Street mentions that Handel wrote a composition, Tamerlano, using two clarinets (20:93). Street also mentioned that

the Cathedral of Antwerp possessed the manuscript, until recently lost, of a five-part Mass written by Adam Joseph Faber in 1726. Faber's composition supposedly had one clarinet part.

"Some writers have firmly maintained that the word clarinet in scores composed before about 1770 was used to indicate high pitch trumpets" Orchestration experts agree the parts could have been played by "exceptionally skilled trumpet players," but the possibility seems unlikely (8:6-7).

Curt Sachs (18:412) states, "Clarinets were used in Paris in 1749, when two of them played in Rameau's opera Zoroastre, though the score did not indicate them."

"The clarinet was not formally introduced into the orchestra until Jean Phillipe Rameau produced his pastoral play in 1757 called Acante et Cephise" (9:56).

Men who have made a serious study of when the clarinet was really first used say that "the first undoubted reference to clarinets in musical scores was in 1762," when Thomas Arne scored for clarinets in his Artaxerxes (19:120).

CHAPTER IV

SKETCHES AND FINGERING CHARTS OF THE PRINCIPAL CLARINETS

The illustration and fingering chart for the two-key clarinet points out the missing b' flat. To sound b' flat, the clarinetist was to finger b' and slacken the embouchure. The noticeable lack of "difficult whole-step and half-step trills" is partly because of the missing b' flat. Also, the range had not yet been extended down to e.

The addition of keys aided the clarinetist in playing in many tonalities with greater ease. During the late 18th century, many clarinets were made of different lengths in an effort to make easier the playing of all tonalities. Some clarinets were equipped with separate joints, ring inserts, or even a sliding double tube with two sets of finger holes and pads. Clarinets have been made in almost every pitch. With more than one instrument to keep in tune, clarinetists had unsolvable tuning problems. The performer concluded that one instrument must meet the demands of the music. Thus the improvement of the clarinet mechanism and the emphasis upon faster finger technique was stressed.

The thirteen-key clarinet illustrated in this chapter comes from England. It was selected as a "principal" clarinet because it is a direct descendant of the five-key

clarinet. Keys were added, one at a time, to the body of the instrument until thirteen were attached.

The addition of more keys is represented in a changed mechanism. The Boehm-system clarinet has a unique key arrangement not found on earlier clarinets. The Muller clarinet is referred to more often than the thirteen-key clarinet because it was an instrument modifying the tone-hole placement and size according to instrumental acoustics. Muller is also credited with adopting a closed key for the seventh finger. The Muller clarinet, also having thirteen keys, was not popular, but as a basic instrument, it did provide manufacturers a basic concept from which to work toward a better instrument.

Rendall (17:105) states that the Muller-system clarinet required nimbleness of fingers while the Boehm-system required nimbleness of mind to make the correct selection of fingerings. The Muller clarinet was improved by Heckel of Germany shortly after 1845. Carl Barmann added rings and five or six keys to the Muller clarinet in 1860. The Barmann model was replaced by the Oehler clarinet, still in use in Austria and Germany. Other additions or improvements for the Muller clarinet were made by Mahillon and Albert in the 1860s, including the "patent c' sharp key." The Barret action, borrowed from the oboe, was popular in England

during the 1870s. (More details of these clarinets are listed in Rendall's book, The Clarinet).

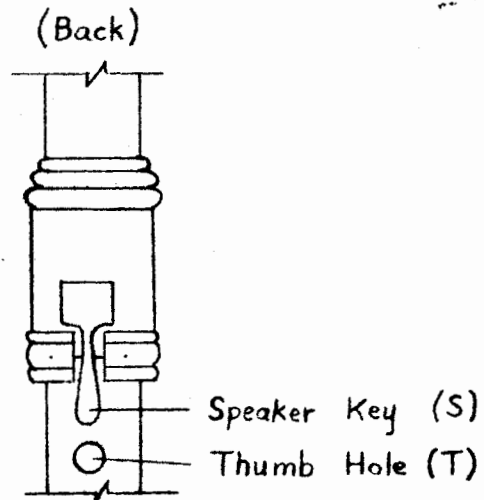
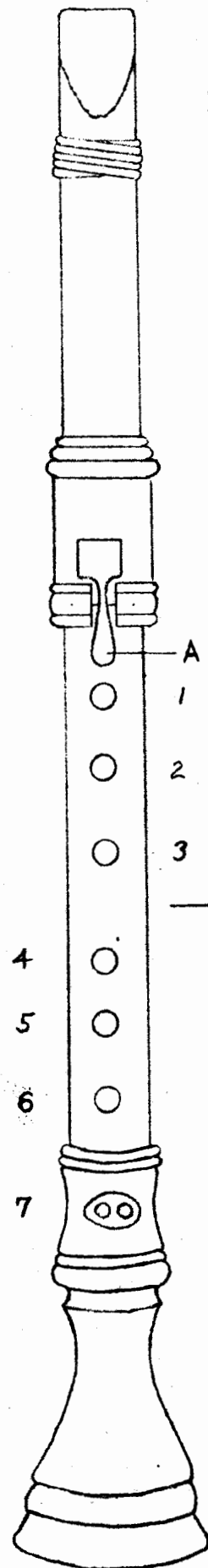
The Boehm-system of 1843 with seventeen keys and six rings is basically the same instrument used today. Manufacturers modify the dimensions of the bore slightly, use larger and stronger keys, alter the tone-holes by flaring (under-cutting from the bore) or repositioning, and make other improvements to prevent faulty mechanisms. The addition of several keys and another ring has been accepted by some clarinetists while most performers rely on the "plain Boehm." The "full Boehm" has an extended range to e flat with a right hand lever for the little finger, a left hand lever for g sharp, an articulated C sharp key, and a ring for the third finger allowing a forked b' flat or a forked e' flat (17:108).

The fingerings for the notes above c''' to g''' on the five-key, thirteen-key, and the Boehm-system clarinets have not been compared in this study but have been included within this chapter for possible future reference. The two-key clarinet's range did not extend above c'''.

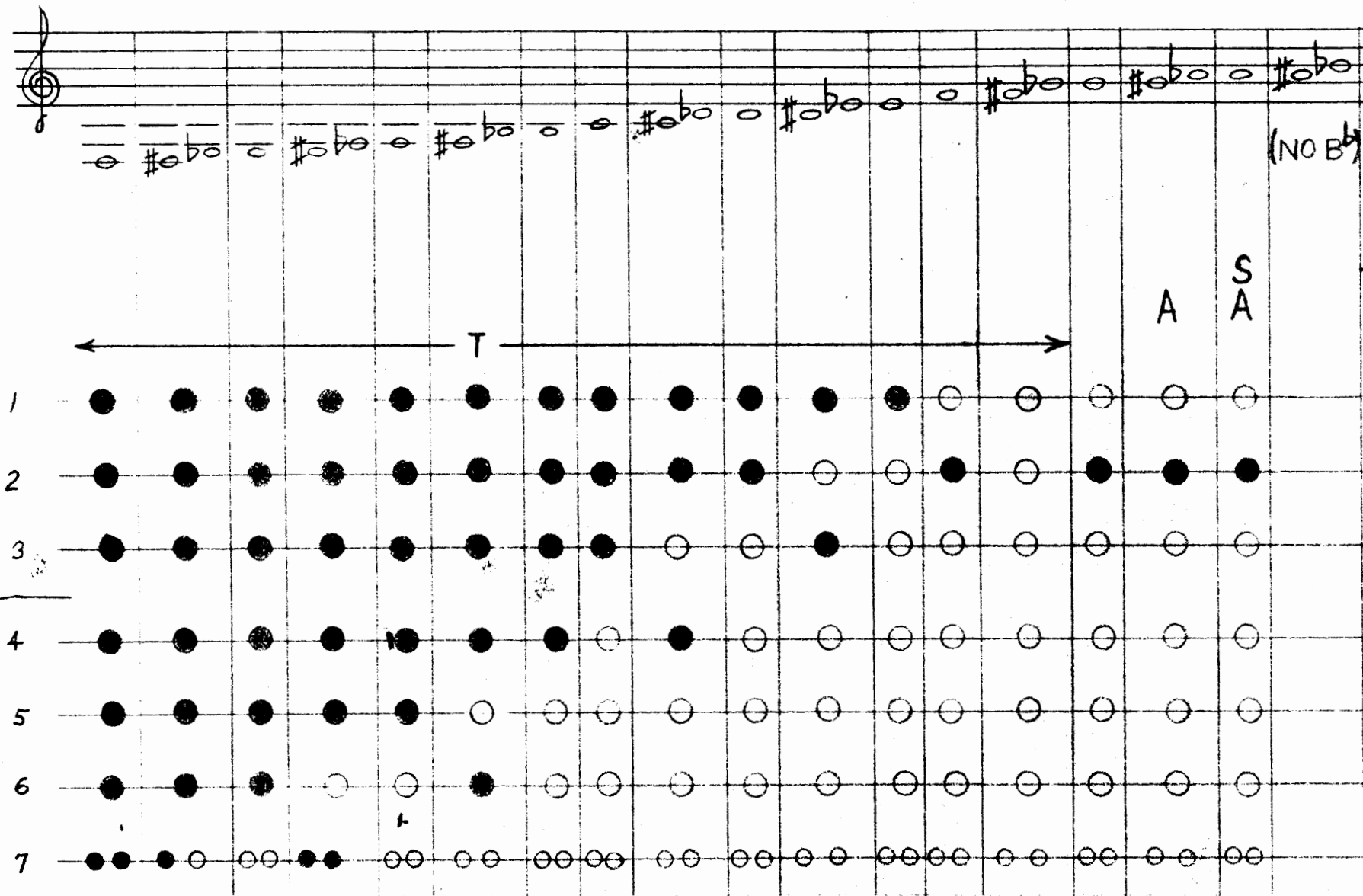
FIGURE 1

DENNER'S TWO-KEY CLARINET c.16

BLACK CIRCLES INDICATE CLOSED HOLES.



Left Hand
Right Hand



Difficult Whole-step and Half-step Trills



FIGURE 2

FIVE-KEY CLARINET c.1760

BLACK CIRCLES INDICATE CLOSED HOLES.
LETTERS INDICATE KEYS TO BE USED.

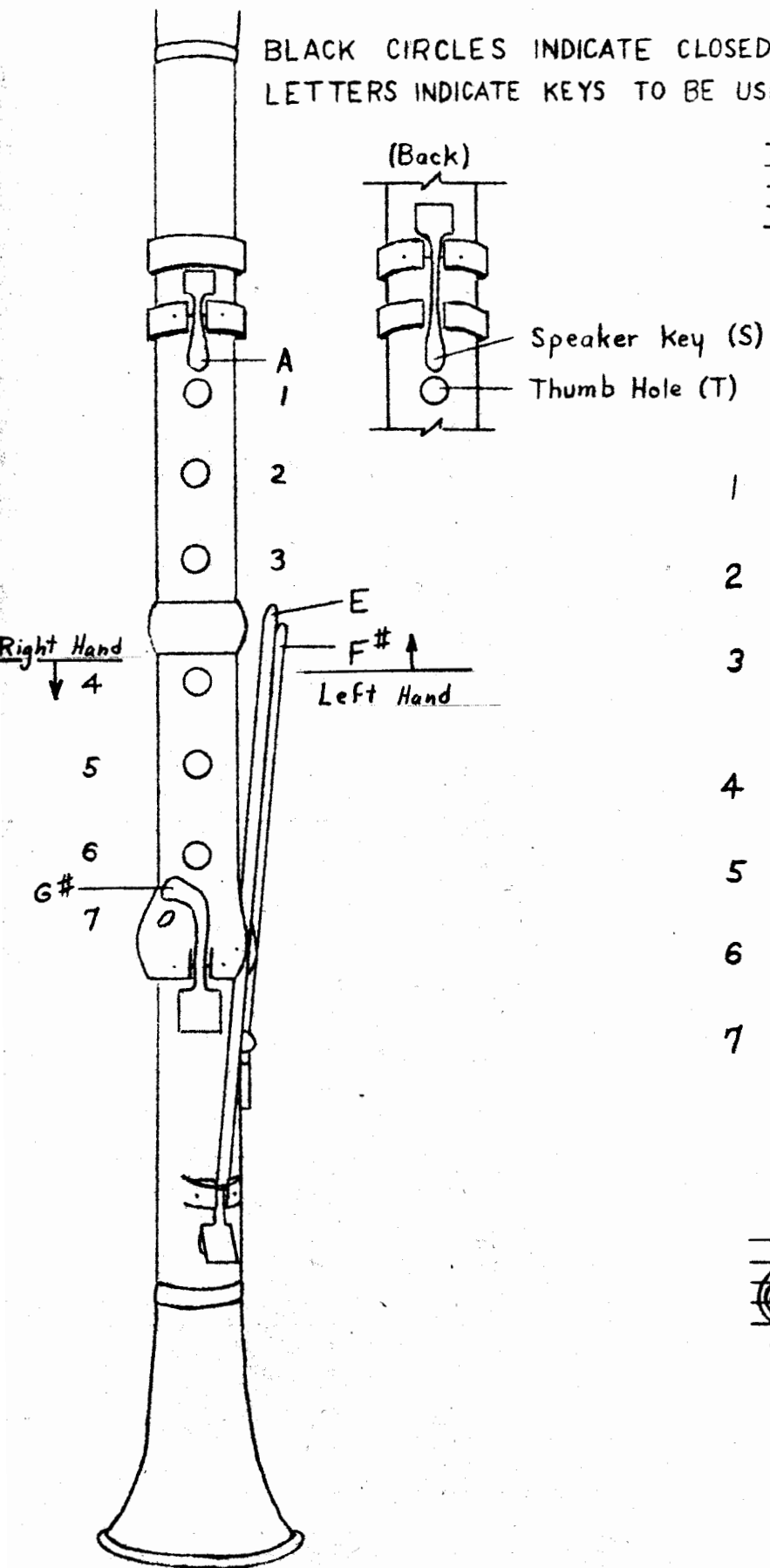


Diagram showing the fingering chart for the five-key clarinet. The chart consists of 7 rows (numbered 1 to 7) and 24 columns. Black circles indicate closed holes, and white circles indicate open holes. Letters (A, E, F#, G#, T) indicate the keys to be used for specific notes. The chart is organized into three groups of eight columns each, with arrows indicating the direction of the fingering sequence.

Row	Col 1	Col 2	Col 3	Col 4	Col 5	Col 6	Col 7	Col 8	Col 9	Col 10	Col 11	Col 12	Col 13	Col 14	Col 15	Col 16	Col 17	Col 18	Col 19	Col 20	Col 21	Col 22	Col 23	Col 24
1	●	●	●	●	●	●	●	●	●	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○
2	●	●	●	●	●	●	●	●	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○
3	●	●	●	●	●	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
4	●	●	●	●	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
5	●	●	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
6	●	●	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
7	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

Difficult Whole-step and Half-step Trills

Diagram showing musical notation for difficult whole-step and half-step trills. The notation is written on a staff with a treble clef, showing various trill patterns across the range of the instrument.

Handwritten musical notation on a staff at the top of the page, featuring various notes and accidentals (sharps, flats, naturals).

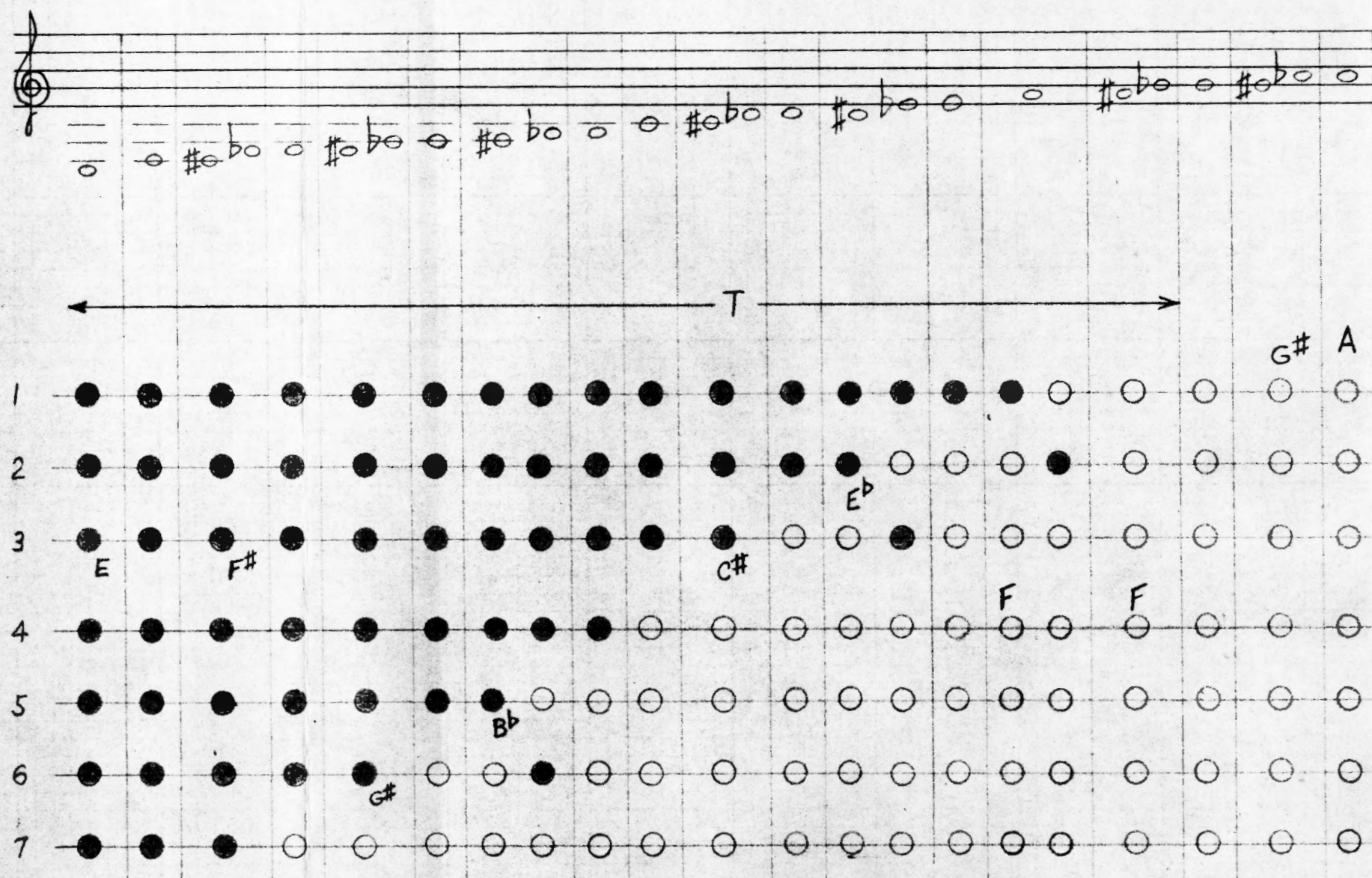
Below the staff is a large grid of circles, likely representing a piano keyboard layout. The grid is divided into two sections by a horizontal line with arrows pointing left and right, labeled 'S' and 'T'.

The grid contains black dots and white circles, representing different notes. Some notes are labeled with letters and accidentals:

- E (on the left side of the grid)
- F# (on the left side of the grid)
- G# (on the left side of the grid)

Handwritten musical notation on a staff at the bottom of the page, featuring various notes and accidentals (sharps, flats, naturals).

THIRTEEN-KEY CLARINET



ET c. 1825 (6:158)

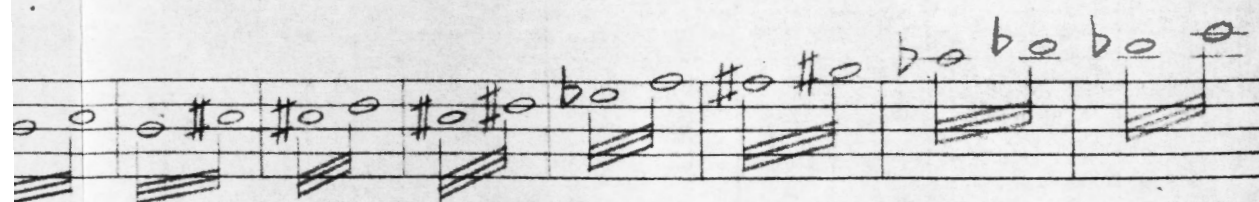
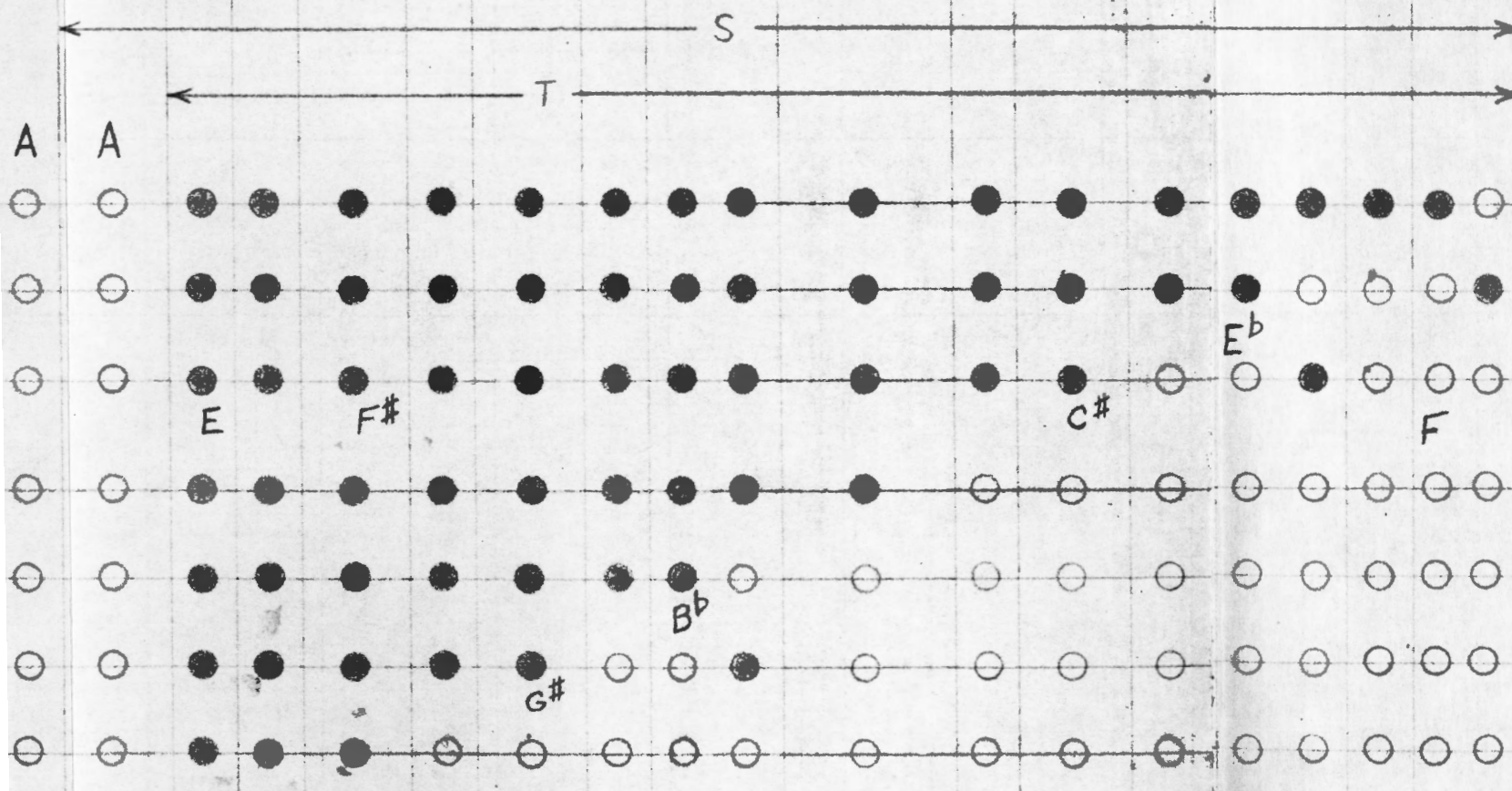
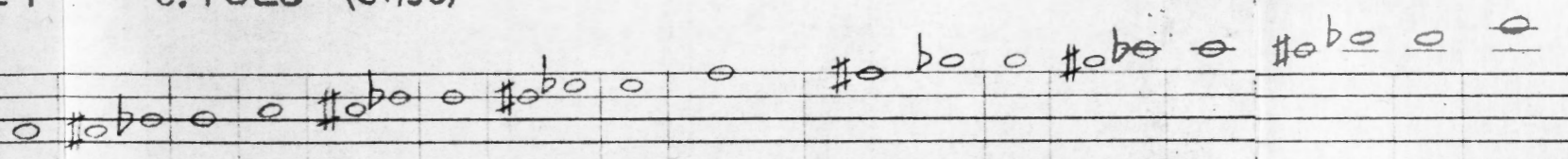
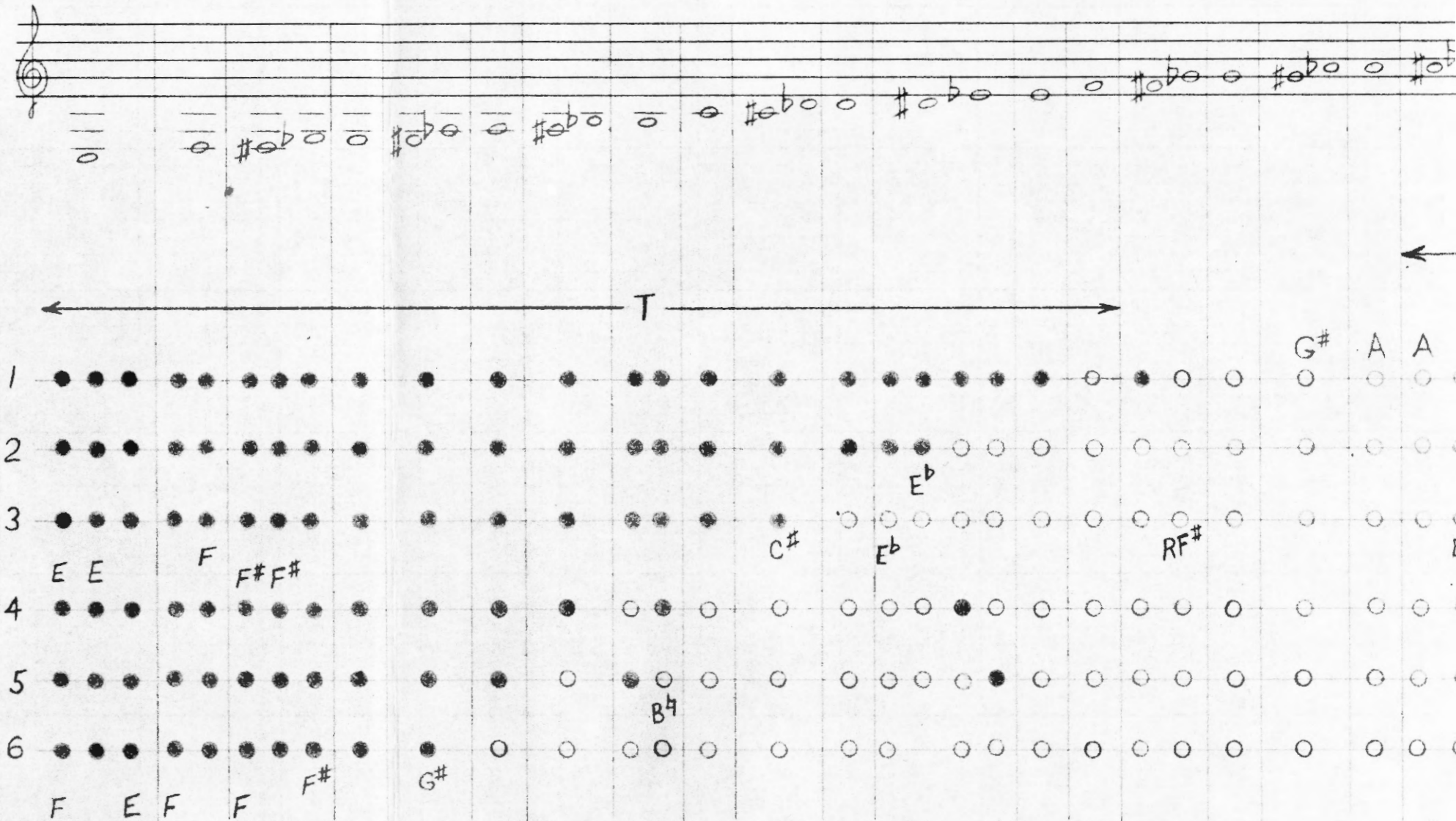
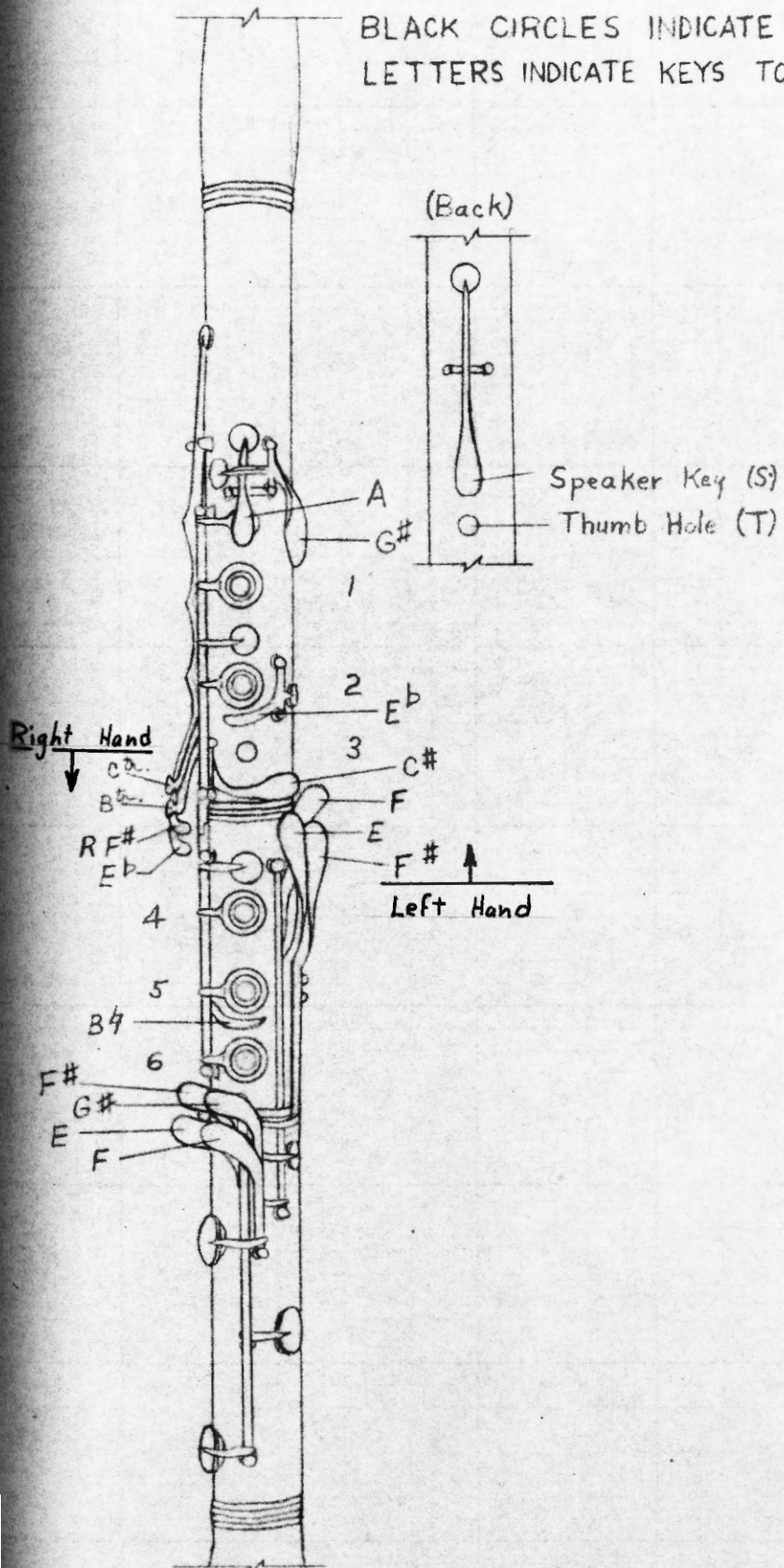


FIGURE 4

BOEHM-SYSTEM CLARINET

184

BLACK CIRCLES INDICATE CLOSED HOLES.
LETTERS INDICATE KEYS TO BE USED.



1843 (22)

Handwritten musical score on a grand staff. The notation consists of a series of notes with accidentals (sharps and flats) and a dot notation system below the staff. The notes are organized into measures, with some measures containing multiple notes. The dot notation system uses black dots on a grid of lines and spaces, with some dots labeled with letters and accidentals.

Labels and notes visible in the score include:

- Notes: G^\sharp , A, A, B^{\flat} , E, E, F, F^\sharp , F^\sharp , G^\sharp , B^{\flat} , C $^\sharp$, E^{\flat} , E^{\flat} .
- Labels: S, T.



FIGURE 5

FIVE-KEY CLARINET FINGERINGS

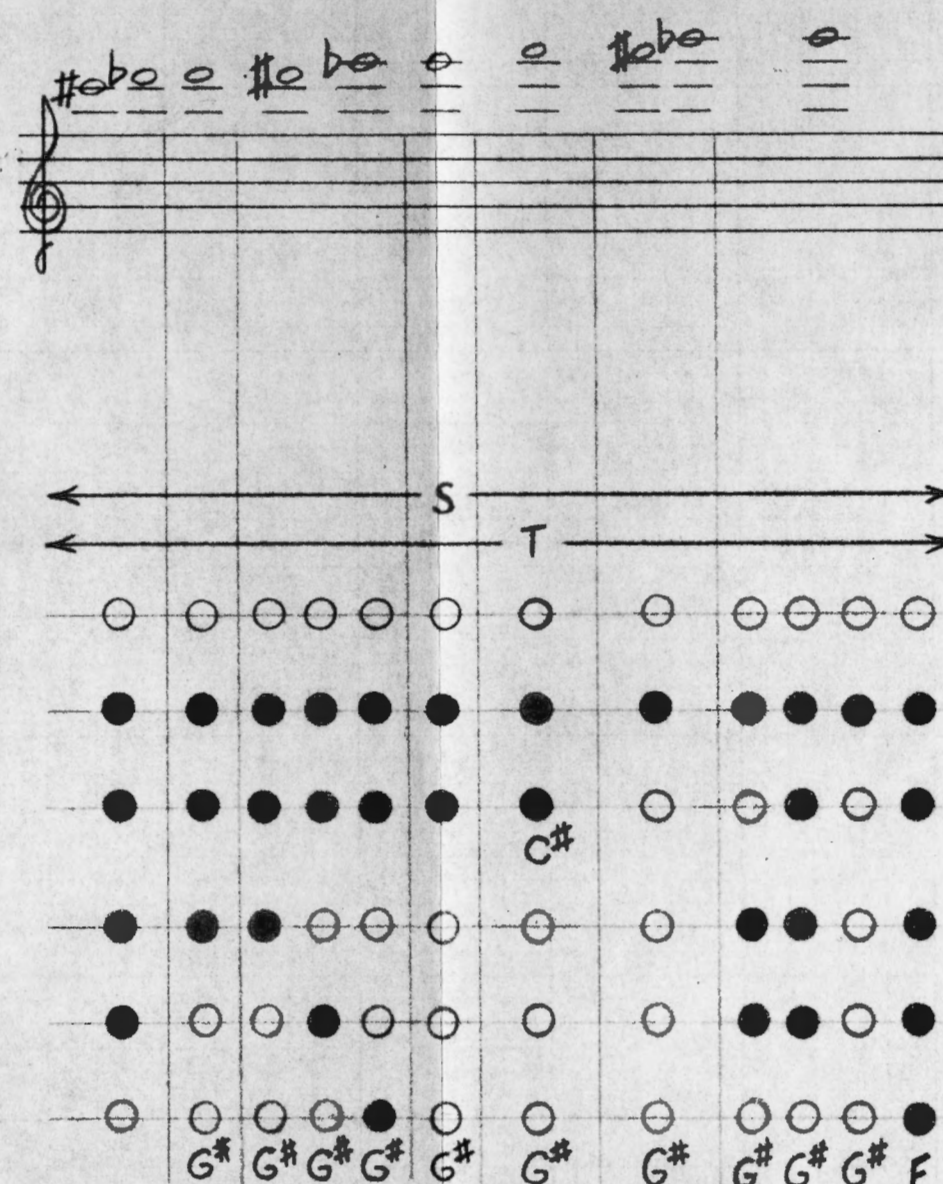
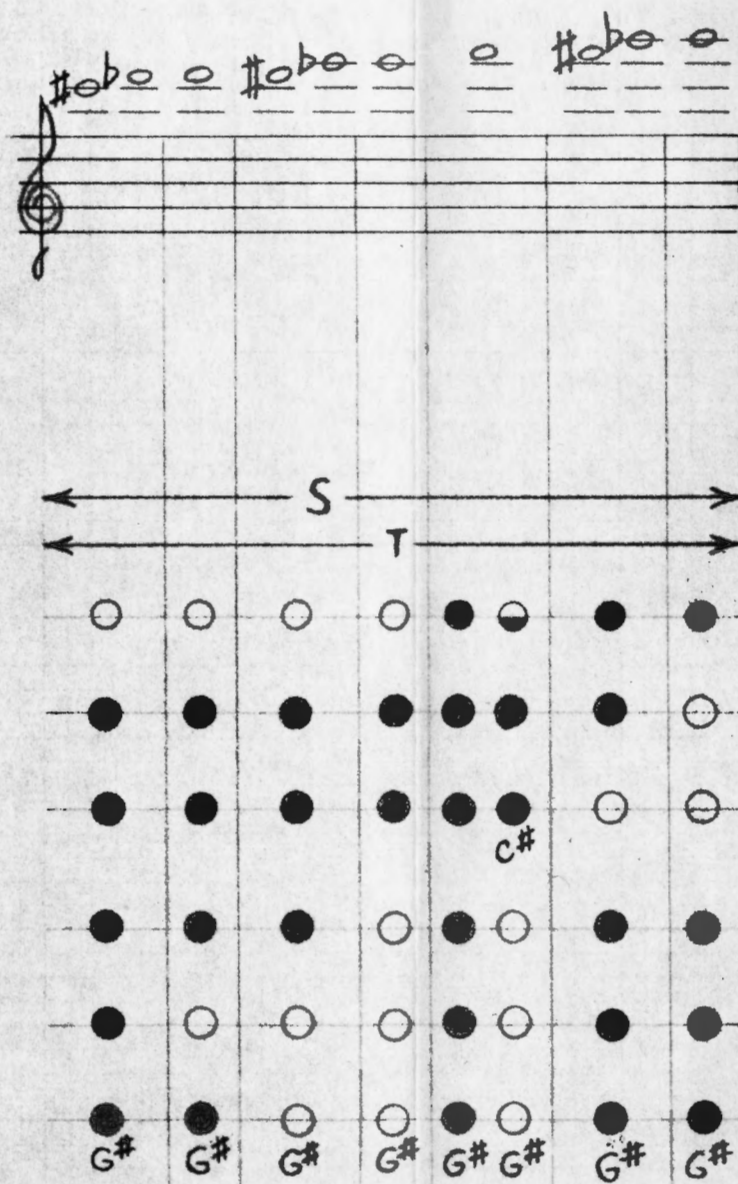
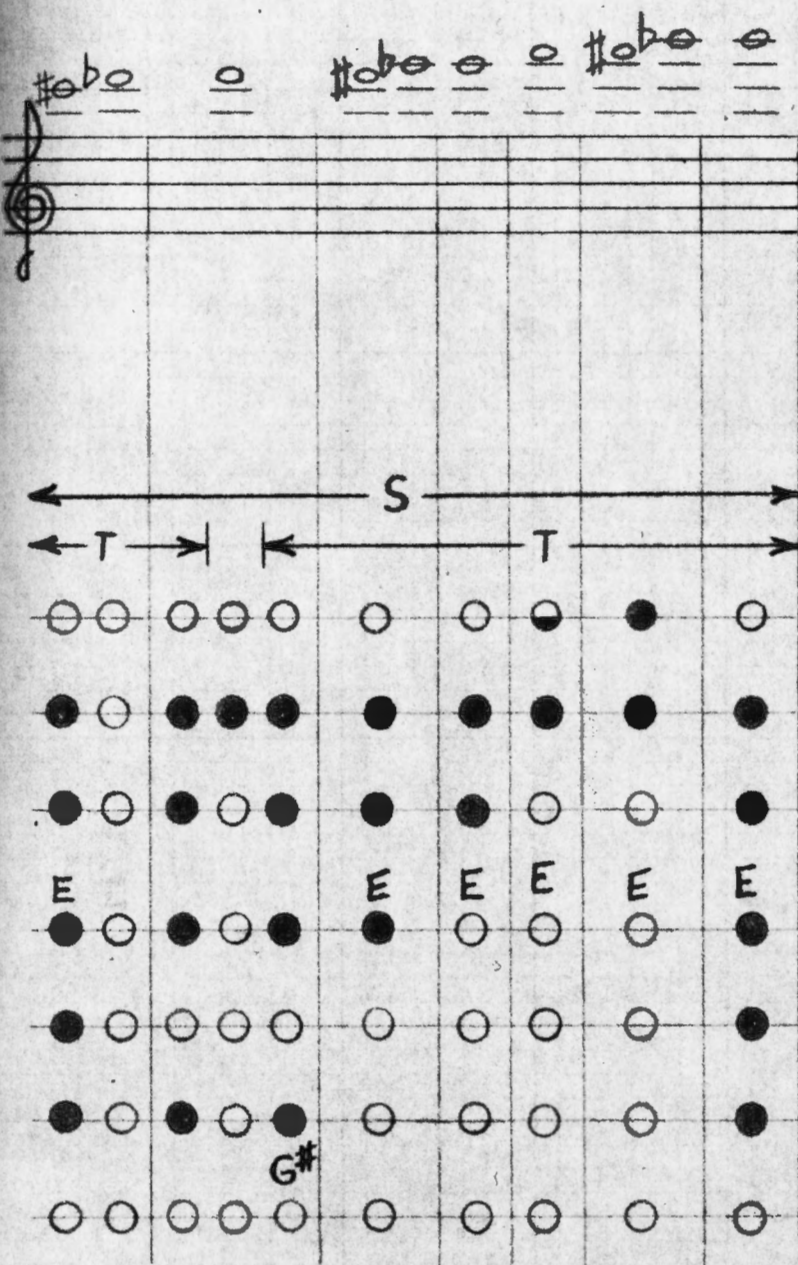
FROM C^{III}# TO G^{III} (15)

THIRTEEN-KEY CLARINET FINGERINGS

FROM C^{III}# TO G^{III} (1:139)

BOEHM-SYSTEM CLARINET FINGERINGS

FROM C^{III}# TO G^{III} (24:147)



CHAPTER V

TECHNIQUE ANALYSIS OF SELECTED CLARINET MUSIC

This chapter will be concerned with technical problems of the music only. Chapter VI will show how the illustrated clarinets of Chapter IV compare to each other in terms of the number and types of difficulties.

The following examples of clarinet music are in chronological order ranging from 1757 to 1815. The music tends to indicate that with the improvement of the clarinet mechanism, the composers wrote music containing more difficult technique problems.

The music within this chapter requires a mental analysis by any person expecting to play it as intended. As the eye of the musician scans the music, the main limitations become evident--the tempo, or rate of speed, the key signature, and the range. Upon further mental analysis other more detailed information may be observed--the types of articulation, the diatonic and chromatic passages, arpeggios, wide skips, trills, or other note patterns.

The analysis of the music within this chapter will follow the pattern stated above. Accordingly, a short synopsis will point out the main limitations. Following the synopsis, descriptive words will point out further details

of the music. The words in parenthesis will relate to the rate of speed and the particular section of music being analyzed. The numbers correspond to the measure numbers on the music. Diagonal marks within the music indicate an omission of notes or measures.

I. CLARINET CONCERTO¹

The music appears difficult at first glance because of the sixteenth and thirty-second notes, but the tempo marking, adagio, indicates a slow tempo. The third movement tempo, poco presto, in 3/8 rhythm, mainly uses eighth notes. Leaps of an octave downward are common. The range of the music lies within one and one-half octaves, from about e' to c''', with most of the notes within the range of the octave b' flat to b'' flat. There are no dynamic markings. The concerto has a noticeable lack of slurs. Stamitz knew only the two-key clarinet, an instrument requiring frequent cross-fingering.

The following words indicate and measure-numbers point out the type of technical problems encountered within the Stamitz' concerto:

¹This composition, written by Johann Stamitz, believed to be the first concerto written for clarinet, is in manuscript only. Peter Gradenwitz (14:145-150) has copied the measures herein from the Stamitz manuscript.

1. Diatonic passages: (adagio, 1st mvt.¹) meas.² 1 and 2; (adagio, 2nd mvt.) meas. 8 and 9; (poco presto, 3rd mvt.) meas. 3 and 4.
2. Skips: (adagio, 1st mvt.) meas. 1; (adagio, 2nd mvt.) meas. 5 and 6; (poco presto, 3rd mvt.) meas. 5 and 6.
3. Trills: (adagio, 1st mvt.) meas. 3; (adagio, 2nd mvt.) meas. 1 and 2.

II. SYMPHONY IN D MAJOR (K.385)

This symphony does not use clarinets in the 2nd and 3rd movements. The range of notes is usually within the confines of the staff. Skips of over an octave do not occur. Double-dotted quarter-notes appear regularly in the first movement.

The following words indicate and measure-numbers point out the type of technical problems encountered within the Symphony in D Major by Mozart:

1. Tongued diatonic passages: (allegro con spirito, 1st mvt.) meas. 56 and 146.
2. Trills: (allegro con spirito, 1st mvt.) meas. 4.

¹The abbreviation for movement.

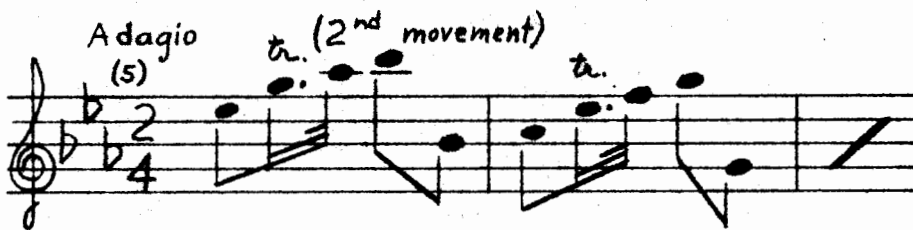
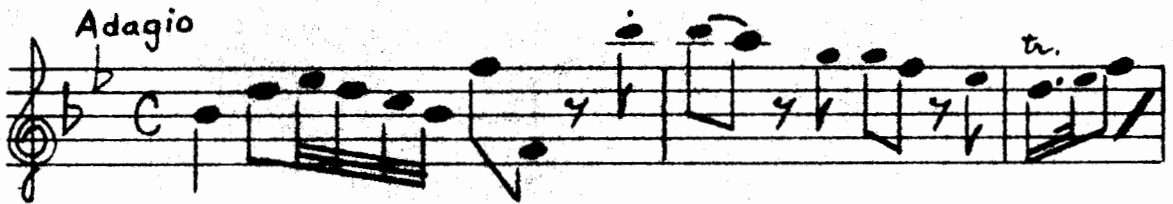
²The abbreviation for measure.

FIGURE 6

35

CLARINET CONCERTO

J. STAMITZ



3. Skips: (allegro con spirito, 1st mvt.) meas.
2, 3, and 5; (presto, 4th mvt.) meas. 177 and
178.
4. Repeated figures: (allegro con spirito, 1st
mvt.) meas. 75 and 76; meas. 77, 78, and 79;
(presto, 4th mvt.) meas. 63, 64, and 65; meas.
257, 258, and 259.

III. CLARINET CONCERTO IN A MAJOR

In commenting about Mozart's clarinet concerto, Martha K. Ward (27:129) states:

There has never yet been anything written to surpass it as a whole for technical accomplishments disguised in peerless melody.

The concerto uses many of the difficult passages listed by Berlioz (see Figure 18) as intervals to avoid. The key signature shows one flat in the second movement while the other two movements are in the key of C for the clarinet. The slurring of diatonic runs and chromatic passages is frequent as is the tonguing of such passages.

The following words indicate and measure-numbers point out the type of technical problems encountered within Mozart's Clarinet Concerto in A Major:

1. Arpeggios: (allegro, 1st mvt.) meas. 69, 73,
82, 83, and 143-147; (adagio, 2nd mvt.) meas.

FIGURE 7

37

SYMPHONY IN D MAJOR (K. 385)

W. A. MOZART

Allegro con spirito

(1)

f

tr. marc.

(56)

p

f

(74)

f

sf

sf

sf

sf

sf

sf

sf

(146)

f

Presto (4th movement)

(63)

fp

fp

fp

fp

fp

fp

f

(175)

(257)

- 56-57; (rondo, 3rd mvt.) meas. 106-107, 108-109, 110, 111, and 313-315.
2. Ascending thirds: (allegro, 1st mvt.) meas. 148-149.
 3. Chromatic slurring: (allegro, 1st mvt.) meas. 67 and 152; (adagio, 2nd mvt.) meas. 52; (rondo, 3rd mvt.) meas. 105, 107, and 109.
 4. Chromatic tonguing: (allegro, 1st mvt.) meas. 152.
 5. Diatonic slurring: (allegro, 1st mvt.) meas. 66; (adagio, 2nd mvt.) meas. 55 and 57.
 6. Diatonic tonguing: (allegro, 1st mvt.) meas. 74 and 141-142.
 7. Fast passages: (adagio, 2nd mvt.) meas. 55 and 57.
 8. Skips: (allegro, 1st mvt.) meas. 62, 70, 92, 145-146, and 147-148; (adagio, 2nd mvt.) meas. 56-57; (rondo, 3rd mvt.) meas. 106-107, 108-109, 110, 111, and 313-315.
 9. Trills: (allegro, 1st mvt.) meas. 74 and 153; (adagio, 2nd mvt.) meas. 53; (rondo, 3rd mvt.) meas. 314.

IV. SYMPHONY NO. 2

FIGURE 8

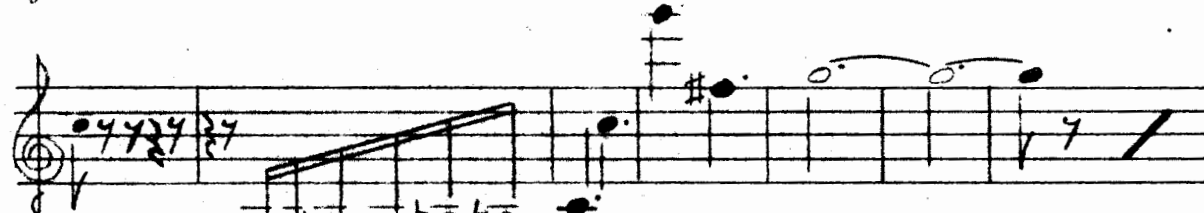
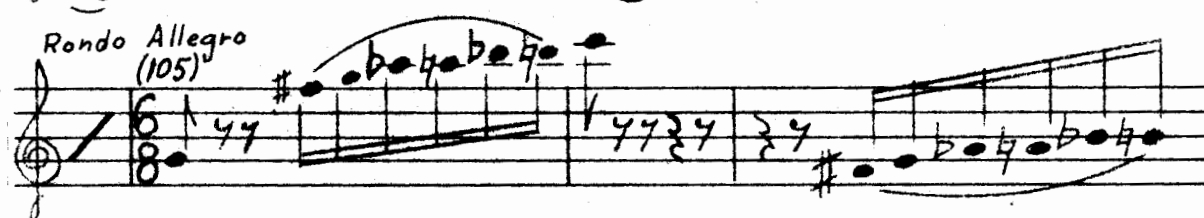
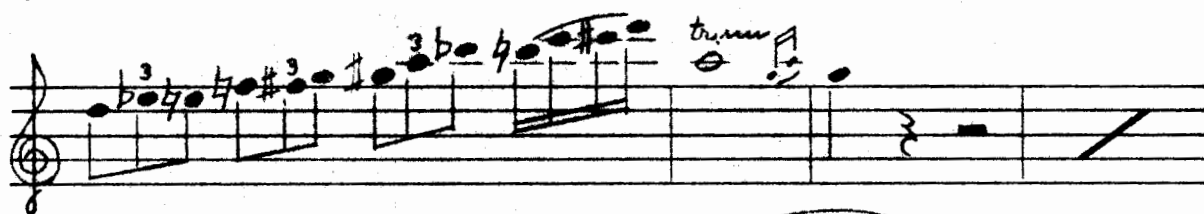
CLARINET CONCERTO IN A MAJOR

W. A. MOZART

Allegro
(57)

p

This musical score is for the Clarinet Concerto in A Major by Wolfgang Amadeus Mozart, specifically Figure 8, measures 57 through 141. The tempo is marked 'Allegro' and the initial dynamic is 'p' (piano). The score is written for a single melodic line on a treble clef staff. It begins with a common time signature 'C'. The music is characterized by rapid sixteenth-note passages, often beamed in groups of four or six. There are several trills, indicated by a 'tr.' marking. Measure numbers (57), (78), and (141) are placed above the staff. The key signature of one sharp (F#) is maintained throughout. The notation includes various accidentals (sharps, flats, naturals) and slurs to indicate phrasing. The piece concludes with a double bar line at measure 141.



Haydn's symphony has simple clarinet parts. The range generally is within the octave of c' to c'', although the range frequently is extended downward to g'. The key signature of F gives problems to some of the earlier clarinets. Arpeggios, wide skips, and fast tongued or slurred passages were not written.

The following words indicate and measure-numbers point out the type of technical problems encountered within the Symphony No. 2 by Haydn:

1. Diatonic slurring: (allegro, 1st mvt.) meas.
58 and 60; (allegro, 3rd mvt.) meas. 326-330.
2. Diatonic tonguing: (allegro, 1st mvt.) meas. 46.
3. Repeated passages: (allegro, 3rd mvt.) meas.
319, 321, and 323; 325, 326, 327, 328, and
329.
4. Trills: (allegro, 1st mvt.) meas. 8.

V. SYMPHONY NO. 3

The clarinets have a range from g to c''. The use of the clarinet's lowest register, the chalumeau, was not common because of the intonation problems in that register. Beethoven boldly used low arpeggios in the 4th movement. Tongued notes are preferred to slurred passages. The tempos are varied while the key signature always has one flat for

SYMPHONY NO. 2

JOSEPH HAYDN

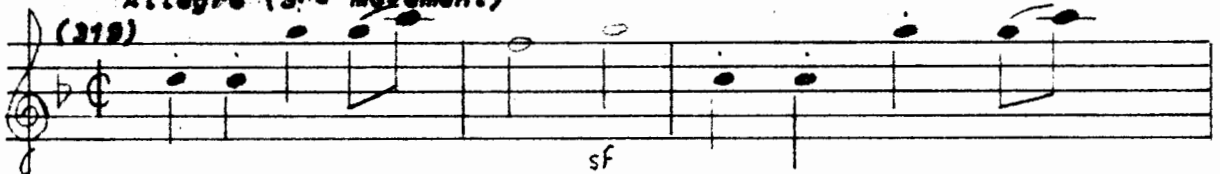
Allegro (1st movement)
(46)



Allegro (3rd movement)
(1)



Allegro (3rd movement)



the clarinet.

The following words indicate and measure-numbers point out the type of technical problems encountered within Beethoven's Symphony No. 3:

1. Arpeggios: (allegro con brio, 1st mvt.) meas. 37, 312, 314, and 316-319; (poco andante, 4th mvt.) meas. 365-368.
2. Fast passages: (presto, 4th mvt.) meas. 431-449 and 453-461.
3. Repeated passages: (poco andante, 4th mvt.) meas. 365 and 366.
4. Slurred diatonic passage: (adagio assai, 2nd mvt.) meas. 146.
5. Tongued chromatic passage: (presto, 4th mvt.) meas. 447-448.
6. Tongued diatonic passages: (allegro con brio, 1st mvt.) meas. 35-36; (presto, 4th mvt.) meas. 432-434, 447-448, and 459-460.

VI. QUINTETT IN B DUR

The clarinet part frequently illustrates the technique of today. Leaps of over two octaves are common. Slurred chromatic and tongued diatonic passages occur repeatedly. The key signature shows no flats or sharps but accidentals

FIGURE 10
SYMPHONY NO. 3

L. V. BEETHOVEN

Allegro con brio
(35)

Adagio assai (2nd movement)
(145)

Poco Andante (4th movement)
(365)

sempre piu f

43

Presto (4th movement)
(431)

(447)

(453)

sempre piu f

carry the clarinet to distant tonalities. Full use of the clarinet's dynamic possibilities are visible.

The following words indicate and measure-numbers point out the type of technical problems encountered within Weber's Quintett in B Dur:

1. Arpeggios: (adagio, Fantasia) meas. 37, 299, 349-350, 353, 354, and 355.
2. Chromatic slurring: (adagio, Fantasia) meas. 39, 40, 42, and 352.
3. Chromatic tonguing: (adagio, Fantasia) meas. 44.
4. Diatonic tonguing: (adagio, Fantasia) meas. 292, 293-298, 348, and 356.
5. Skips: (adagio, Fantasia) meas. 36, 38, 38-39, 39-40, 46, and 355-356.
6. Trills: (adagio, Fantasia) meas. 38 and 46.

FIGURE II

QUINTETT III B DUR

45

C. M. WEBER

Allegro (12)

Adagio (Fantasia) (35)

PP — f — P

PP

(cresc. — — — — — ff) P mf

(292)

(348)

f

CHAPTER VI

COMPARISON OF THE PRINCIPAL CLARINETS USING MOZART'S CLARINET CONCERTO IN A MAJOR

I. COMPARISON OF THE DENNER TWO-KEY CLARINET TO THE FIVE-KEY CLARINET

The two-key clarinet, as made by Denner in about 1696, had as its worst fault, the same fingering for b' flat as for b' natural. The player had to finger b' natural and relax the embouchure, lip muscles, to play b' flat. Thus any note combination involving b' flat meant a sudden change of the lip muscles. Examples of note combinations using b' flat are illustrated in measures 82, 83, and 85 of the 1st movement, marked allegro, measure 52 of the adagio section, and measure 107 of the rondo allegro movement. The b' flat fingering was remedied on the five-key clarinet with the lengthening of the instrument and by placing the speaker key above the A key.

The lengthened five-key instrument accommodated three keys on the lower joint. The E key also produced b' natural with the speaker key opened. Thus most note combinations involving e or b' natural on the five-key instrument were easier to finger. The use of the E key is shown in the following measures: measures 60, 61, 68, 69, 71, 141, 143,

and 149 of the 1st movement, measures 52, 55, and 56 of the adagio section, and measures 107 and 108 of the rondo section.

Another key eliminating some awkward finger movements was the key for f sharp and, with the speaker key, c' sharp. The two-key instrument required the sliding of the little finger if fingering e to f or, with the speaker key, c' to c' sharp, while the addition of this key meant only the pressing or releasing of the lever. Examples of the use of the F sharp key are found in measures 67 and 71 of the 1st movement and 52 of the adagio section.

The third key to be added to the two-key clarinet enabled the playing of a flat and, with the speaker key, e' flat by pressing a lever instead of fork-fingering. Measures 78-79 and 146 of the 1st movement illustrate the use of e' flat and measure 109 of the rondo section shows an example using a flat.

By modifying the tone-holes on the five-key instrument, g' could be produced with no fingers, as opposed to using the second finger on the two-key clarinet. This improvement aided in most note combinations involving g, as shown in measures 141, 147, and 148 of the 1st movement, 55 and 56 of the adagio section, and 107 and 316 of the rondo section.

The five-key clarinet made the following
marked passages easier!

FIGURE 12

CLARINET CONCERTO IN A MAJOR

W. A. MOZART

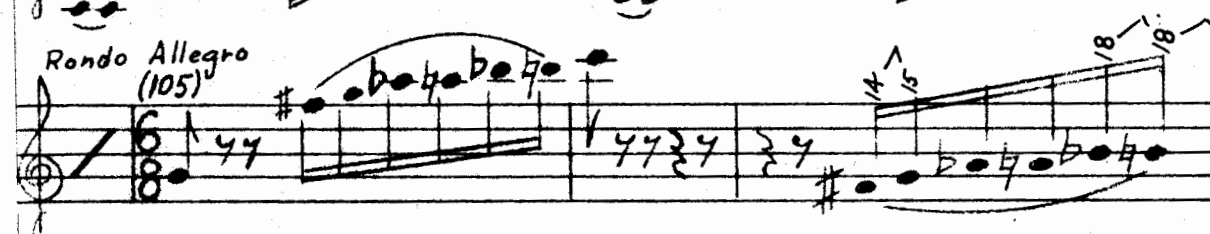
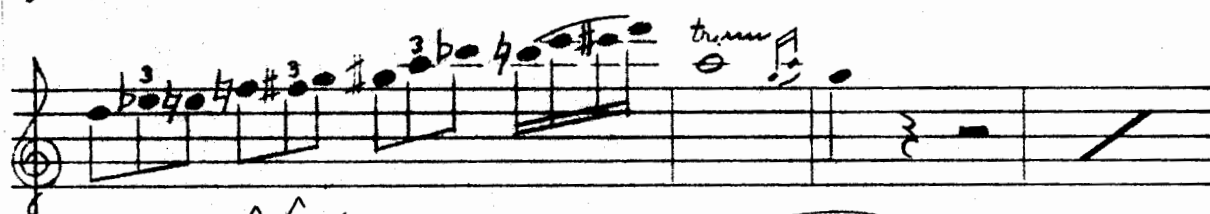
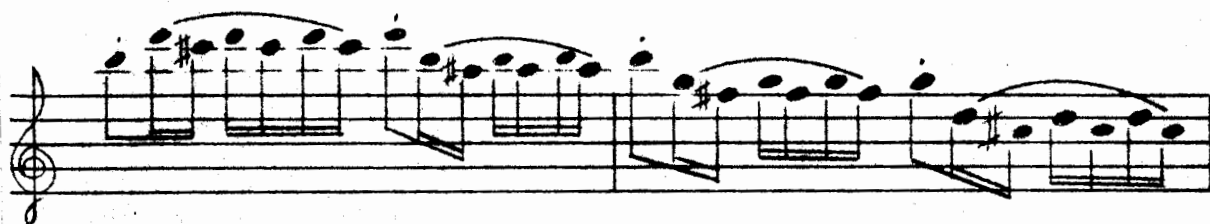
Allegro
(57)

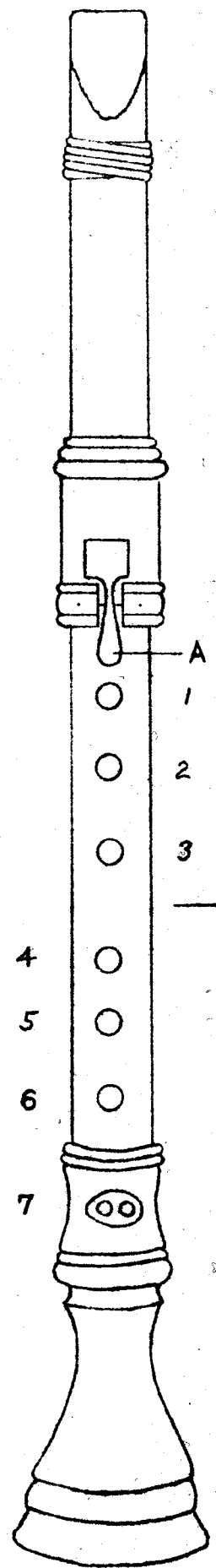
tr.

(78)

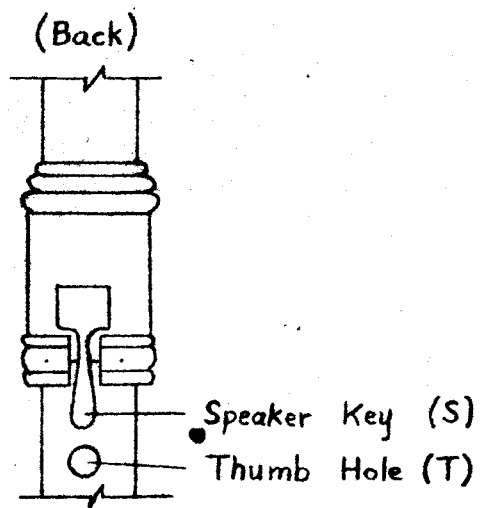
(141)

Numbers above the notes indicate the fingerings
given for the Denner Two-key clarinet.



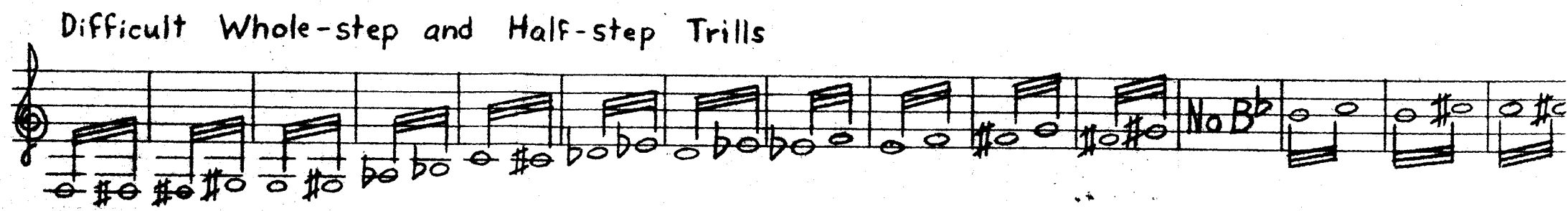
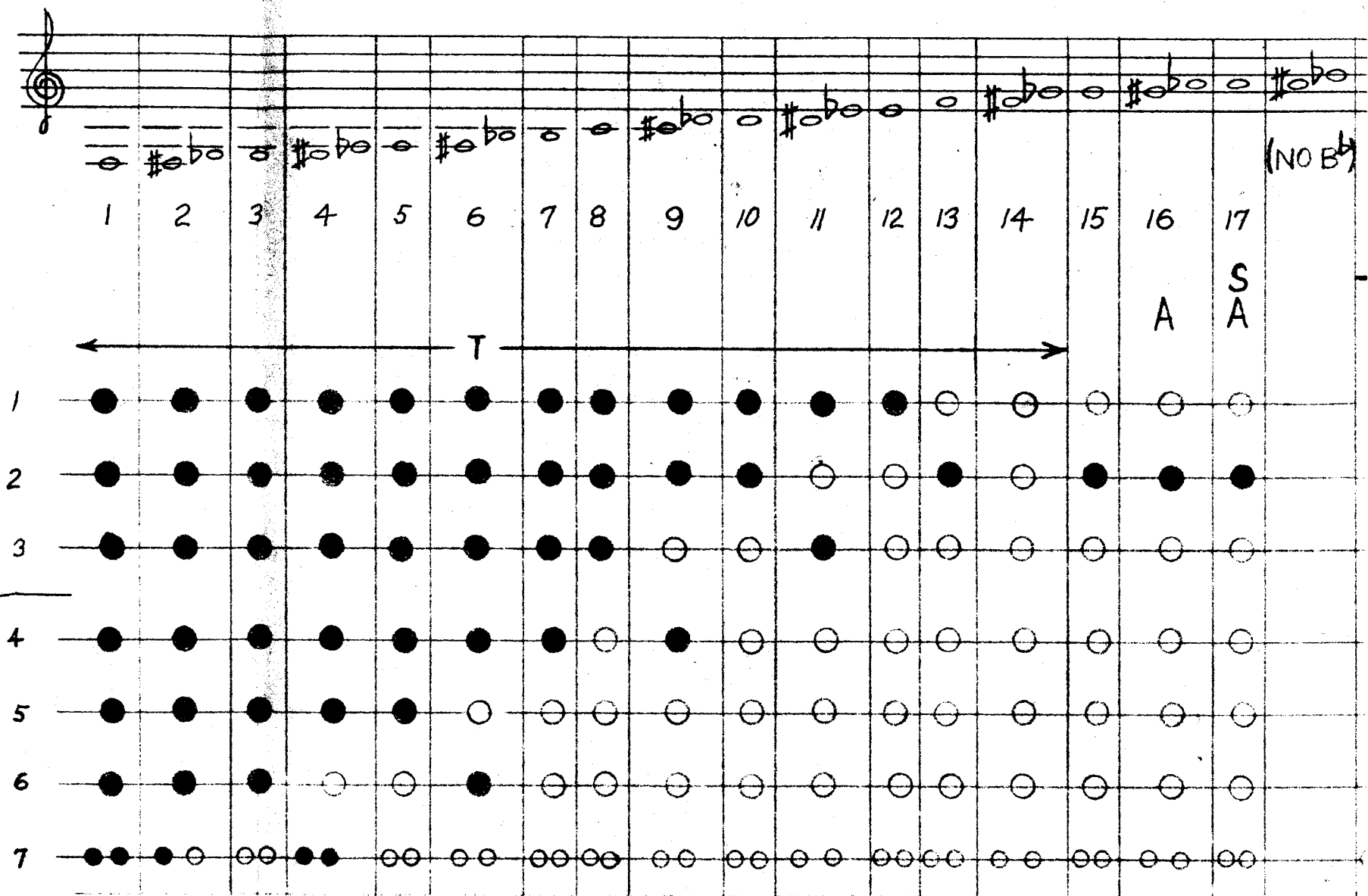


BLACK CIRCLES INDICATE CLOSED HOLES.



Left Hand
Right Hand

FIGURE 13 DENNER'S TWO-KEY CLARINET c.16



c. 1696 (6)

49

Handwritten musical notation at the top of the page:

b o o # b o o # b o o # b o o # b o o # b o o o

(NO B^b)

	18	19	20	21	22	23	24	25	26	27	28	29	30	31
S	← S →													
A	← T →													
	○	●	●	●	●	●	●	●	●	●	●	●	○	○
	○	●	●	●	●	●	●	●	●	●	●	○	○	●
	○	●	●	●	●	●	●	●	●	○	○	●	○	○
	○	●	●	●	●	●	●	●	○	●	○	○	○	○
	○	●	●	●	●	○	○	○	○	○	○	○	○	○
	○	●	●	○	○	○	●	○	○	○	○	○	○	○
	○	○	○	○	○	○	○	○	○	○	○	○	○	○

Handwritten musical notation at the bottom of the page:

o o # o b o b o b o o o o b o b o b o o o o

II. COMPARISON OF THE FIVE-KEY CLARINET TO THE THIRTEEN-KEY CLARINET

The five-key clarinet, having many notes requiring fork-fingering, was outdated as soon as additional keys were provided. For many years, though, the five-key instrument was the standard model. The eight added keys of the thirteen-key clarinet were not added all at once but one at a time. This instrument was selected as a "principal" clarinet because it was the most improved instrument having all the keys, including similar construction features, of the older instruments.

The notes, a to b flat and e'' to f'' of the five-key instrument were cross-fingered in the right hand, but a side B flat key operated by the sixth finger eliminated the problem, as the following examples show: measures 57, 58, 61, 63, 66, 67, 69, 71, 72, 74, 141, 142-143, and 152 of the 1st movement, 52, 55, and 57 of the adagio movement, and 109 of the rondo section.

The addition of the C sharp cross-key for the left hand removed the need for fork-fingering c' sharp or d' flat and, with the speaker key, g' sharp or a' flat. Examples of note combinations involving these notes are pointed out in the 1st movement, measures 63, 67, 79, 84, 87, 88, and

147; in the adagio section, measure 52; and in the rondo section, measure 105.

The notes e' to f' and b'' to c''' had always been a fork-fingering problem until the addition of the side F key used by the fourth finger. Use of the F key is found in measures 66, 70, 142, and 152 of the 1st movement, in 52 and 55-56 of the adagio section, and in 105-106 of the rondo section.

Note combinations involving b'' flat were always awkward until the addition of the E flat cross-key. Examples appear in the 1st movement, measures 84, 86, 87, 92, and 152; in the adagio section, measure 52; and in the rondo section, measure 105.

The side key for g' sharp stopped fork-fingerings when using that tone. Note combinations including g' sharp or a' flat appear in measure 83 of the 1st movement, 52 of the adagio section, and 107 of the rondo section.

The fork-fingering for a' on the five-key instrument presented problems overcome on the thirteen-key clarinet by tone-hole modification. The following examples show uses of notes in combination with a': measures 146 and 148 of the 1st movement and 312 of the rondo section.

The thirteen-key clarinet made the following
marked passages easier!

FIGURE 14
CLARINET CONCERTO IN A MAJOR

W. A. MOZART

Allegro (57)

p

tr. un.

(78)

(141)

The musical score consists of eight staves of music in treble clef, 4/4 time. The key signature has one sharp (F#). The score includes various musical notations such as notes, rests, slurs, and dynamic markings. Fingerings are indicated by numbers 1-3 above notes. The score is divided into measures by bar lines, with measure numbers 57, 78, and 141 marked. The first staff begins with 'Allegro' and '(57)'. The second staff has a piano dynamic marking '*p*'. The third staff has a trill marking 'tr. un.'. The fourth staff has a measure rest. The fifth staff has a measure rest. The sixth staff has a measure rest. The seventh staff has a measure rest. The eighth staff has a measure rest.

Numbers above the notes indicate the fingerings
given for the Five-Key clarinet.

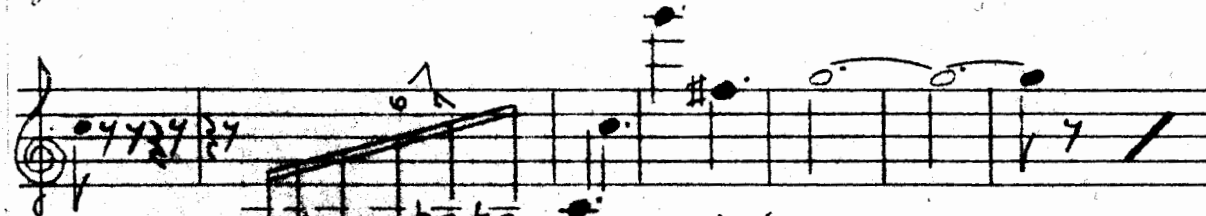
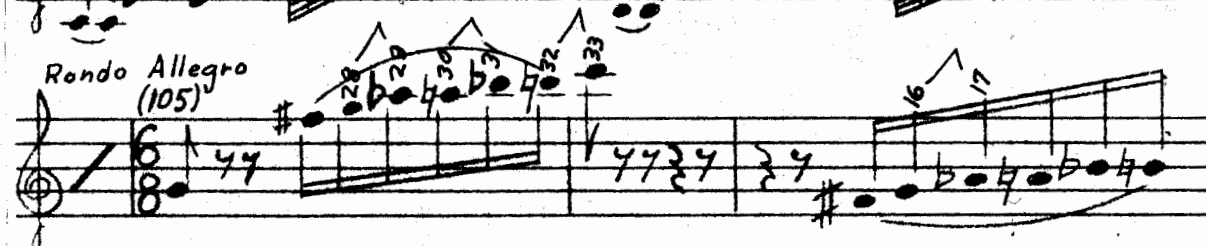
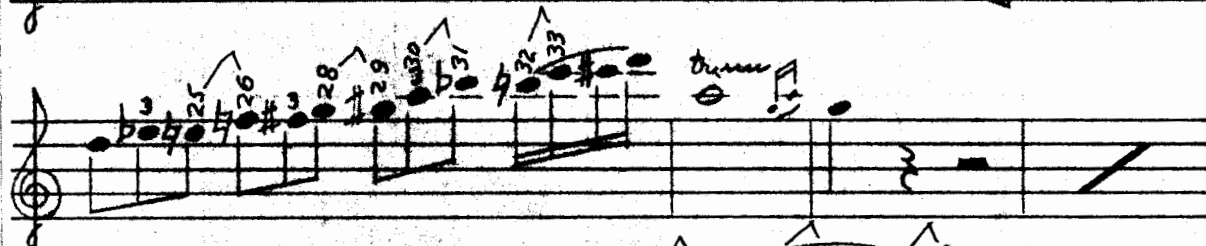
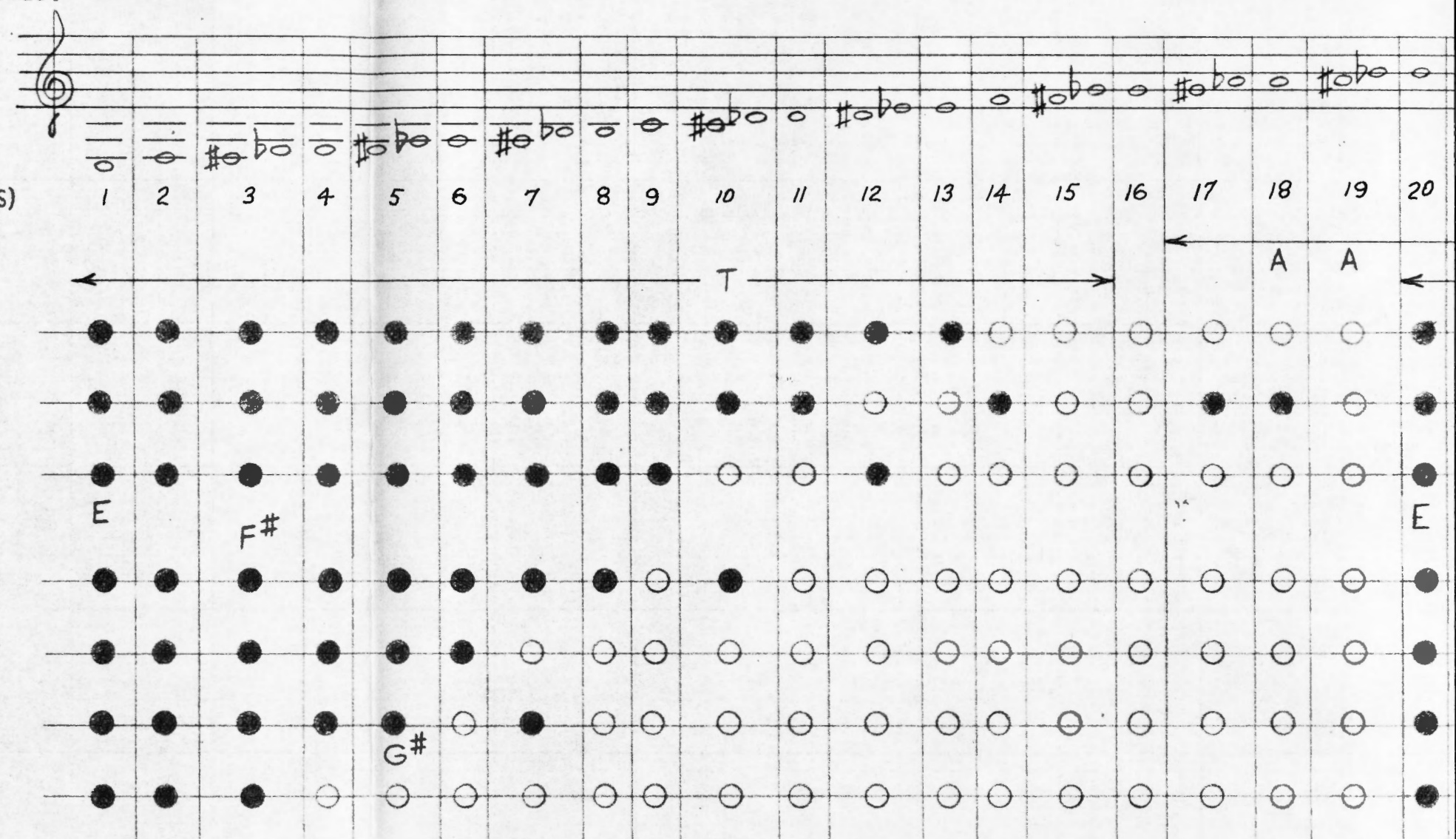
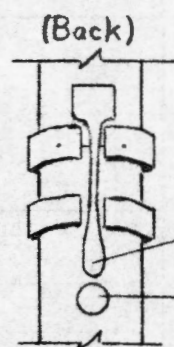


FIGURE 15

FIVE-KEY CLARINET c.1760 (15)

BLACK CIRCLES INDICATE CLOSED HOLES.
LETTERS INDICATE KEYS TO BE USED.



Difficult Whole-step and Half-step Trills



60 (15)

Handwritten musical notation on a staff, showing a sequence of notes with accidentals (sharps and flats) and a key signature change. The notes are: \flat , \flat , \flat , \sharp , \flat , \flat , \sharp , \flat , \flat , \flat , \sharp , \flat , \flat , \sharp , \flat , \flat , \flat , \flat .

Below the staff, a grid of circles represents a musical score. The columns are numbered 19 to 33. The rows are labeled A, S, T, E, F#, and G#.

Row A: A horizontal line with arrows at both ends, labeled S and T.

Row E: A horizontal line with arrows at both ends, labeled E.

Row F#: A horizontal line with arrows at both ends, labeled F#.

Row G#: A horizontal line with arrows at both ends, labeled G#.

The grid contains black dots and white circles, indicating the presence or absence of notes in specific positions.

Handwritten musical notation on a staff, showing a sequence of notes with accidentals (sharps and flats) and a key signature change. The notes are: \flat , \flat , \flat , \sharp , \flat , \flat , \sharp , \flat , \flat , \flat , \flat , \flat , \flat , \flat , \flat , \flat .



III. COMPARISON OF THE THIRTEEN-KEY CLARINET TO THE BOEHM-SYSTEM CLARINET¹

The Boehm-system clarinet uses a mechanism devised by Klose and Buffet from the Boehm flute. Duplicate keys are provided for the little fingers of both hands. In addition, side keys and rings offer duplicate fingerings for many tones.

Until the use of the Boehm-system clarinet, several fingering combinations made the use of c''' awkward. A ring fitted to the thumb hole eliminated the need for the F key of the thirteen-key clarinet except as a trill key. Examples of note combinations awkward for the thirteen-key clarinet but easy for the Boehm-system when using c''' include measures 70-71, 84, and 149 of the 1st movement. An example of an f' trill to g' is illustrated in measure 314 of the rondo section.

The duplicate keys for the little fingers on the Boehm-system clarinet gave at least two fingerings for the following notes: e, f, f sharp or g flat, b', c'', and c'' sharp or d'' flat. Thus the little fingers had a choice of levers, depending on the note combination, to almost entirely eliminate fork-fingering and the sliding from one

¹The Boehm-system fingering chart is in Chapter IV.

key to another. The notes e and f sharp or g flat and, with the speaker key, b' and c' sharp or d' flat could be fingered with either little finger instead of using both little fingers as was needed on the thirteen-key clarinet. The following measures show the use of one little finger on the Boehm-system whereas the thirteen-key clarinet required the use of both little fingers: measures 67, 69, 71-72, 89-90, 92, 143, 147, 148, and 152 in the 1st movement, 52 in the adagio section, and 109 in the rondo section. Measure 146 of the 1st movement illustrates a right little finger slide from c' to d' flat if using the thirteen-key clarinet. However, the Boehm-system fingering would use the left little finger for c' and the right little finger for d' flat.

Certain fingerings involving the tone f' were improved on the Boehm-system clarinet by the addition of a ring key on the lower joint, as is shown in measures 73, 80, 85, and 87 of the 1st movement.

The upper joint was fitted with a ring key covering finger holes numbered one and two. Thus it was not necessary to fork-finger f' sharp or g' flat but only to use the left index finger. Measures including an f' sharp combination of notes are as follows: measures 141, 146, and 148 of the 1st movement and 107 of the rondo section.

Another improvement over the thirteen-key clarinet was the linking together of the ring keys of both joints with a separate connecting link. Measure 89 of the 1st movement points out a use for this improvement. If using the Boehm-system clarinet, after fingering f'', the raising of the second and third fingers allows b'' flat to sound. In the lower register the first note sounded would be b flat and by raising the second and third fingers, e' flat would sound.

The Boehm-system clarinet made the following
marked passages easier!

FIGURE 16
CLARINET CONCERTO IN A MAJOR

W. A. MOZART

Allegro

(57)

p

Numbers above the notes indicate the fingerings
given for the thirteen-key clarinet.

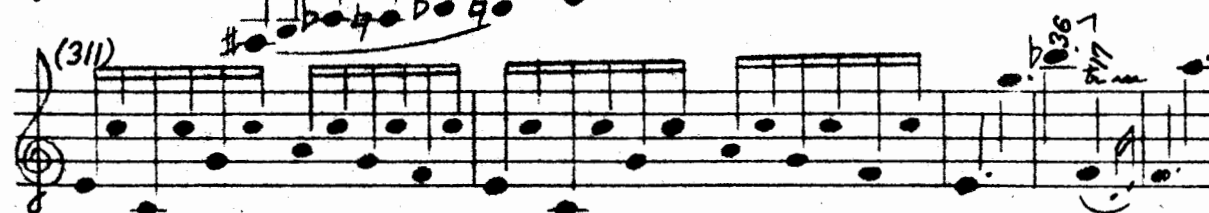
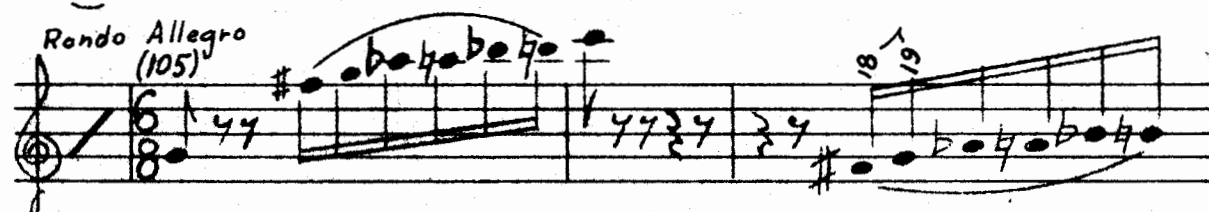
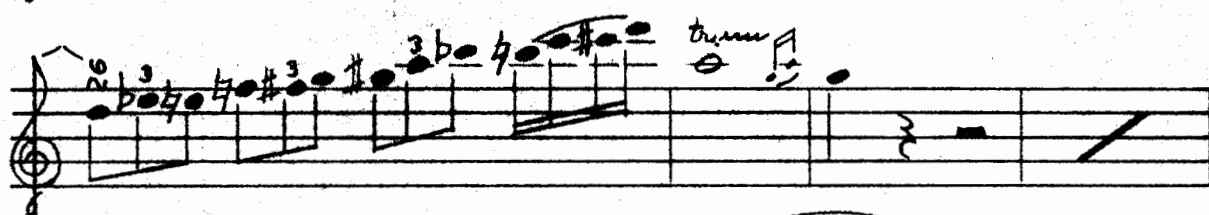
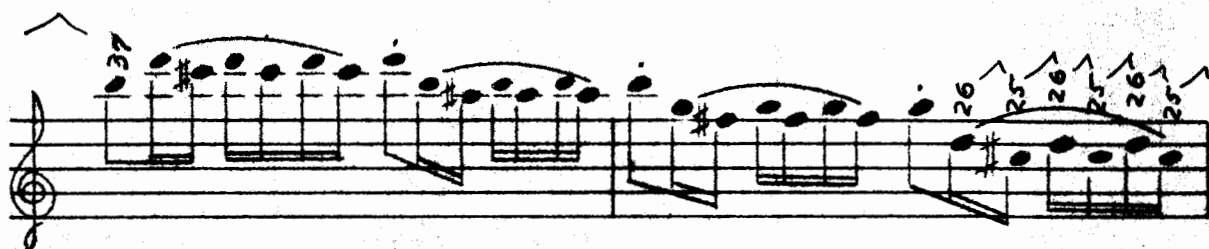
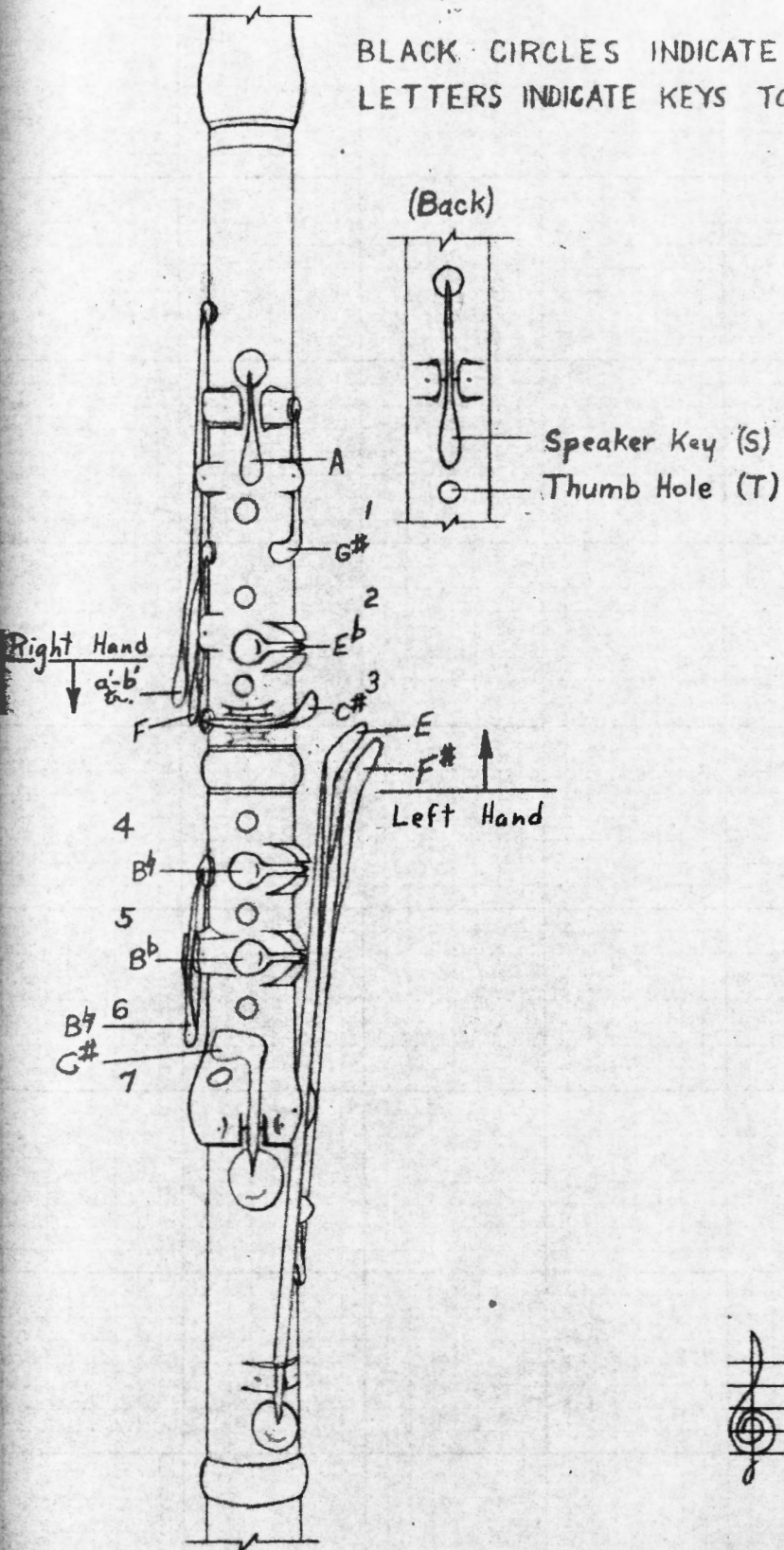


FIGURE 17

THIRTEEN-KEY CLARINET

c. 18

BLACK CIRCLES INDICATE CLOSED HOLES.
LETTERS INDICATE KEYS TO BE USED.

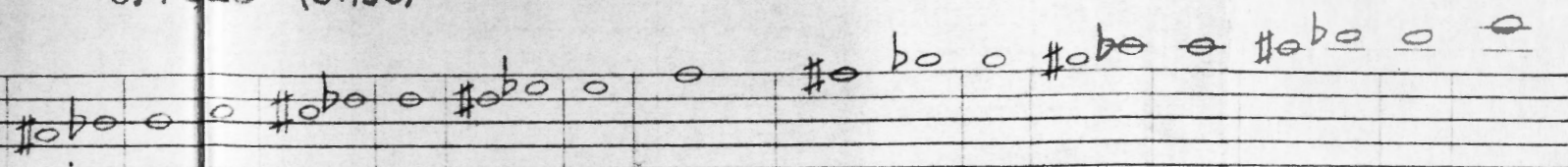


The musical notation shows a sequence of notes on a staff, numbered 1 through 23. The notes are: 1 (G#), 2 (Eb), 3 (F), 4 (Bb), 5 (Bb), 6 (G#), 7 (C#), 8 (E), 9 (F#), 10 (E), 11 (F#), 12 (E), 13 (F), 14 (Bb), 15 (Bb), 16 (G#), 17 (C#), 18 (E), 19 (F#), 20 (E), 21 (F), 22 (Bb), 23 (Bb). Below the staff is a fingering chart with 7 rows (numbered 1 to 7) and 23 columns (numbered 1 to 23). Black circles indicate closed holes, and letters indicate keys to be used. The chart shows the following key positions: Row 1: G# (1), Eb (2), F (3), Bb (4), Bb (5), G# (6), C# (7). Row 2: E (1), F# (2), E (3), F# (4), Bb (5), G# (6), C# (7). Row 3: E (1), F# (2), E (3), F# (4), Bb (5), G# (6), C# (7). Row 4: E (1), F# (2), E (3), F# (4), Bb (5), G# (6), C# (7). Row 5: E (1), F# (2), E (3), F# (4), Bb (5), G# (6), C# (7). Row 6: E (1), F# (2), E (3), F# (4), Bb (5), G# (6), C# (7). Row 7: E (1), F# (2), E (3), F# (4), Bb (5), G# (6), C# (7).

Difficult Whole-step and Half-step Trills

The musical notation shows a sequence of notes on a staff, illustrating difficult whole-step and half-step trills. The notes are: G# (1), Eb (2), F (3), Bb (4), Bb (5), G# (6), C# (7), E (8), F# (9), E (10), F# (11), E (12), F (13), Bb (14), Bb (15), G# (16), C# (17), E (18), F# (19), E (20), F (21), Bb (22), Bb (23), G# (24), C# (25), E (26), F# (27), E (28), F (29), Bb (30), Bb (31), G# (32), C# (33), E (34), F# (35), E (36), F (37), Bb (38), Bb (39), G# (40), C# (41), E (42), F# (43), E (44), F (45), Bb (46), Bb (47), G# (48), C# (49), E (50), F# (51), E (52), F (53), Bb (54), Bb (55), G# (56), C# (57), E (58), F# (59), E (60), F (61), Bb (62), Bb (63), G# (64), C# (65), E (66), F# (67), E (68), F (69), Bb (70), Bb (71), G# (72), C# (73), E (74), F# (75), E (76), F (77), Bb (78), Bb (79), G# (80), C# (81), E (82), F# (83), E (84), F (85), Bb (86), Bb (87), G# (88), C# (89), E (90), F# (91), E (92), F (93), Bb (94), Bb (95), G# (96), C# (97), E (98), F# (99), E (100), F (101), Bb (102), Bb (103), G# (104), C# (105), E (106), F# (107), E (108), F (109), Bb (110), Bb (111), G# (112), C# (113), E (114), F# (115), E (116), F (117), Bb (118), Bb (119), G# (120), C# (121), E (122), F# (123), E (124), F (125), Bb (126), Bb (127), G# (128), C# (129), E (130), F# (131), E (132), F (133), Bb (134), Bb (135), G# (136), C# (137), E (138), F# (139), E (140), F (141), Bb (142), Bb (143), G# (144), C# (145), E (146), F# (147), E (148), F (149), Bb (150), Bb (151), G# (152), C# (153), E (154), F# (155), E (156), F (157), Bb (158), Bb (159), G# (160), C# (161), E (162), F# (163), E (164), F (165), Bb (166), Bb (167), G# (168), C# (169), E (170), F# (171), E (172), F (173), Bb (174), Bb (175), G# (176), C# (177), E (178), F# (179), E (180), F (181), Bb (182), Bb (183), G# (184), C# (185), E (186), F# (187), E (188), F (189), Bb (190), Bb (191), G# (192), C# (193), E (194), F# (195), E (196), F (197), Bb (198), Bb (199), G# (200), C# (201), E (202), F# (203), E (204), F (205), Bb (206), Bb (207), G# (208), C# (209), E (210), F# (211), E (212), F (213), Bb (214), Bb (215), G# (216), C# (217), E (218), F# (219), E (220), F (221), Bb (222), Bb (223), G# (224), C# (225), E (226), F# (227), E (228), F (229), Bb (230), Bb (231), G# (232), C# (233), E (234), F# (235), E (236), F (237), Bb (238), Bb (239), G# (240), C# (241), E (242), F# (243), E (244), F (245), Bb (246), Bb (247), G# (248), C# (249), E (250), F# (251), E (252), F (253), Bb (254), Bb (255), G# (256), C# (257), E (258), F# (259), E (260), F (261), Bb (262), Bb (263), G# (264), C# (265), E (266), F# (267), E (268), F (269), Bb (270), Bb (271), G# (272), C# (273), E (274), F# (275), E (276), F (277), Bb (278), Bb (279), G# (280), C# (281), E (282), F# (283), E (284), F (285), Bb (286), Bb (287), G# (288), C# (289), E (290), F# (291), E (292), F (293), Bb (294), Bb (295), G# (296), C# (297), E (298), F# (299), E (300), F (301), Bb (302), Bb (303), G# (304), C# (305), E (306), F# (307), E (308), F (309), Bb (310), Bb (311), G# (312), C# (313), E (314), F# (315), E (316), F (317), Bb (318), Bb (319), G# (320), C# (321), E (322), F# (323), E (324), F (325), Bb (326), Bb (327), G# (328), C# (329), E (330), F# (331), E (332), F (333), Bb (334), Bb (335), G# (336), C# (337), E (338), F# (339), E (340), F (341), Bb (342), Bb (343), G# (344), C# (345), E (346), F# (347), E (348), F (349), Bb (350), Bb (351), G# (352), C# (353), E (354), F# (355), E (356), F (357), Bb (358), Bb (359), G# (360), C# (361), E (362), F# (363), E (364), F (365), Bb (366), Bb (367), G# (368), C# (369), E (370), F# (371), E (372), F (373), Bb (374), Bb (375), G# (376), C# (377), E (378), F# (379), E (380), F (381), Bb (382), Bb (383), G# (384), C# (385), E (386), F# (387), E (388), F (389), Bb (390), Bb (391), G# (392), C# (393), E (394), F# (395), E (396), F (397), Bb (398), Bb (399), G# (400), C# (401), E (402), F# (403), E (404), F (405), Bb (406), Bb (407), G# (408), C# (409), E (410), F# (411), E (412), F (413), Bb (414), Bb (415), G# (416), C# (417), E (418), F# (419), E (420), F (421), Bb (422), Bb (423), G# (424), C# (425), E (426), F# (427), E (428), F (429), Bb (430), Bb (431), G# (432), C# (433), E (434), F# (435), E (436), F (437), Bb (438), Bb (439), G# (440), C# (441), E (442), F# (443), E (444), F (445), Bb (446), Bb (447), G# (448), C# (449), E (450), F# (451), E (452), F (453), Bb (454), Bb (455), G# (456), C# (457), E (458), F# (459), E (460), F (461), Bb (462), Bb (463), G# (464), C# (465), E (466), F# (467), E (468), F (469), Bb (470), Bb (471), G# (472), C# (473), E (474), F# (475), E (476), F (477), Bb (478), Bb (479), G# (480), C# (481), E (482), F# (483), E (484), F (485), Bb (486), Bb (487), G# (488), C# (489), E (490), F# (491), E (492), F (493), Bb (494), Bb (495), G# (496), C# (497), E (498), F# (499), E (500), F (501), Bb (502), Bb (503), G# (504), C# (505), E (506), F# (507), E (508), F (509), Bb (510), Bb (511), G# (512), C# (513), E (514), F# (515), E (516), F (517), Bb (518), Bb (519), G# (520), C# (521), E (522), F# (523), E (524), F (525), Bb (526), Bb (527), G# (528), C# (529), E 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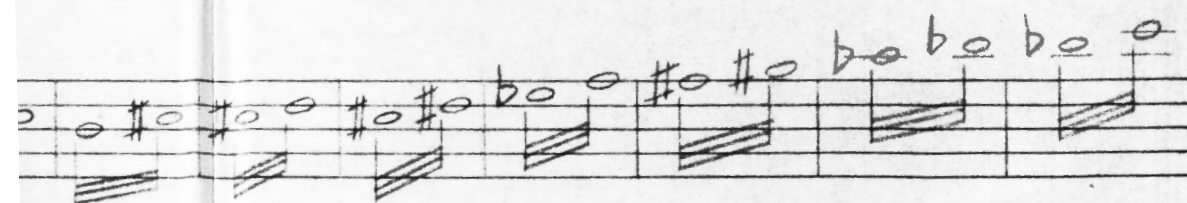
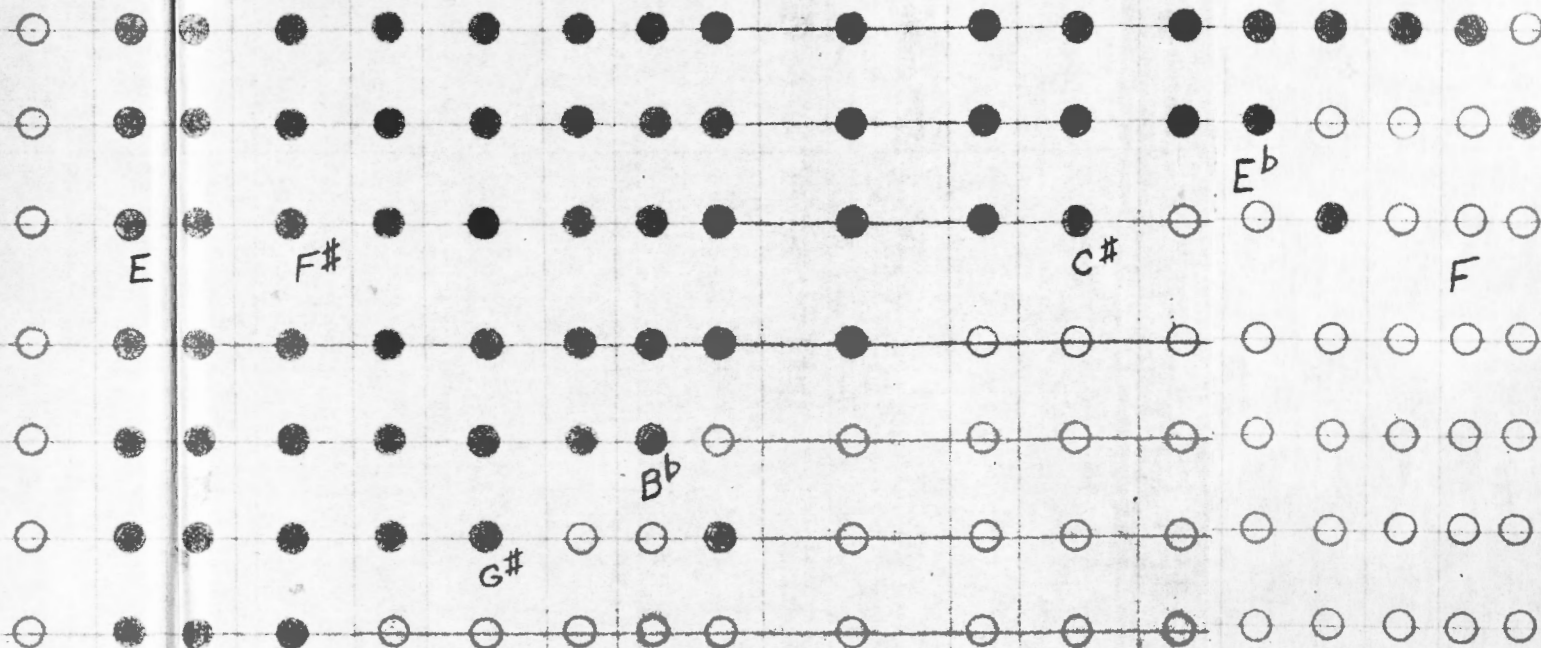


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DIFFICULT PASSAGES FOR THE CLARINET

HECTOR BERLIOZ

A handwritten musical score for guitar, consisting of seven staves. The notation includes various musical symbols such as treble clefs, sharp and flat accidentals, and slurs. The first staff begins with a treble clef and a key signature of one sharp (F#). The music is written in a style that suggests a sequence of chords and melodic fragments, with some measures containing multiple notes beamed together. The score is divided into measures by vertical bar lines, and some measures contain double bar lines, indicating the end of a phrase or section. The handwriting is clear and legible, typical of a composer's draft or a student's exercise. The overall structure of the piece is not explicitly defined, but it appears to be a continuous sequence of musical ideas.

CHAPTER VII

CONCLUSIONS

The history and development of the clarinet and its music has been short. Johann C. Denner, an instrument maker of Nurnberg, improved the chalumeau and is credited with the discovery of the clarinet in 1696. This instrument had two keys, a range from f to c'', no b' flat fingering, and many cross-fingered notes. Denner's first clarinet was soon improved by additional length and a repositioned speaker key. About 1760 the five-key clarinet was available. This model clarinet was the first to be used in the orchestra and the instrument for which many concertos were written. The five-key clarinet, with the addition of the three keys on the lower joint, provided easier facility than the two-key clarinet, especially within the b' natural to e' flat range. Modification of the tone-holes also improved the five-key clarinet's mechanism when playing note combinations involving the throat tones, e' to b' flat.

Keys were added, one at a time, to the basic five-key instrument until the number of keys reached thirteen. The thirteen-key instrument of about 1810, in comparison to the five-key clarinet, permitted easier finger combinations between the throat tones, f' sharp to a', and between e'

and c'''. The use of the clarinet's lowest register was neglected by most composers until the beginning of the 19th century. The addition of keys gave the thirteen-key clarinet better intonation in the low register than the fork-fingered tones of the five-key instrument.

Iwan Muller, a clarinet virtuoso, altered the clarinet mechanism according to instrumental acoustics. The "improved" Muller clarinet was not popular, but it did give manufacturers a basic foundation for later improvements. The Boehm-system clarinet, adopted from the mechanism of the Theobald Boehm flute by Klose and Buffet in 1843, is the instrument most used today. It provided easier facility than the thirteen-key clarinet throughout its total range. Duplicate keys and tone-holes enabled the clarinetist to choose the best finger pattern to accommodate the note pattern.

The clarinet music developed as the clarinet mechanism improved. During the early years of the clarinet, when its fingering was awkward and the intonation faulty, composers wrote for the "best" range of the clarinet, from about e' to c'''. As clarinetists insisted on improved instruments, composers, noticing the improvements, wrote more challenging music for the clarinet. This resulted in a type of competition: composers--writing music challenging the instrument, versus performers--trying to master the music with the least amount of effort.

Manufacturers were not only concerned with the key arrangement and ease of maneuverability but also the clarinet's tone quality. Experiments with different types of wood, various mouthpiece materials, and minute bore and tone-hole dimensions resulted in an instrument having unique qualities, demanded once discovered. With its intonation problems virtually eliminated and the rich tone quality developed, the clarinet became popular as a solo, ensemble, and orchestral instrument.

Although new music requiring faster technique is being written and improvements are continually being tested and accepted, the most widely used clarinet is still, basically, the Boehm-system clarinet of 1843.

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